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MILLER'S

DICTIONARY OF GARDENING,

BOTANY, AND AGRICULTURE;

INCLUDING

PLANTING, LANDSCAPE GARDENING, AND RURAL ARCHITECTURE,

WITH

The Management of Domestic Animals;

CAREFULLY REVISED, AND BROUGHT DOWN TO THE PRESENT STATE OF KNOWLEDGE,
WITH MANY NEW ARTICLES WRITTEN EXPRESSLY FOR THIS WORK
BY THE FOLLOWING CONTRIBUTORS:

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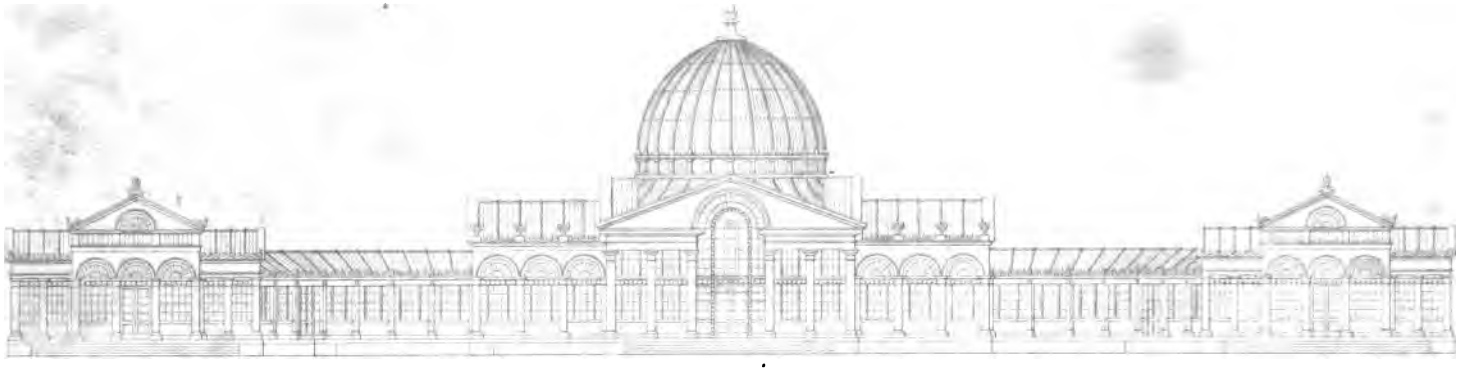

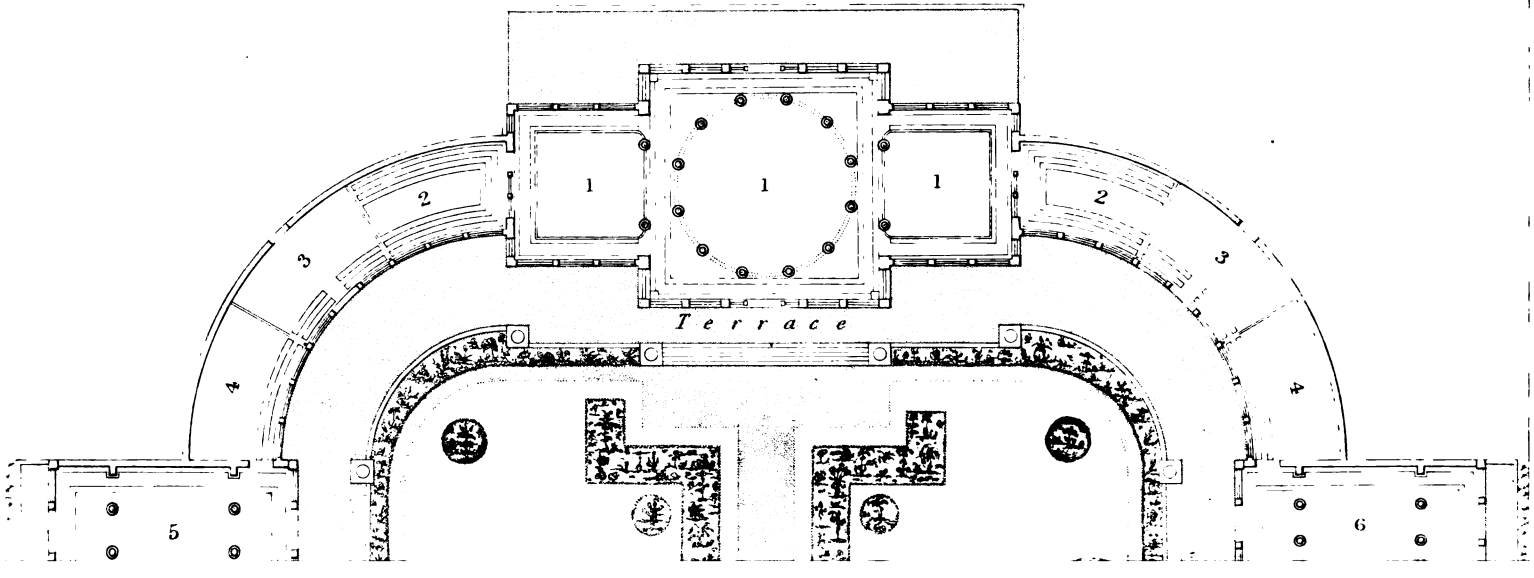

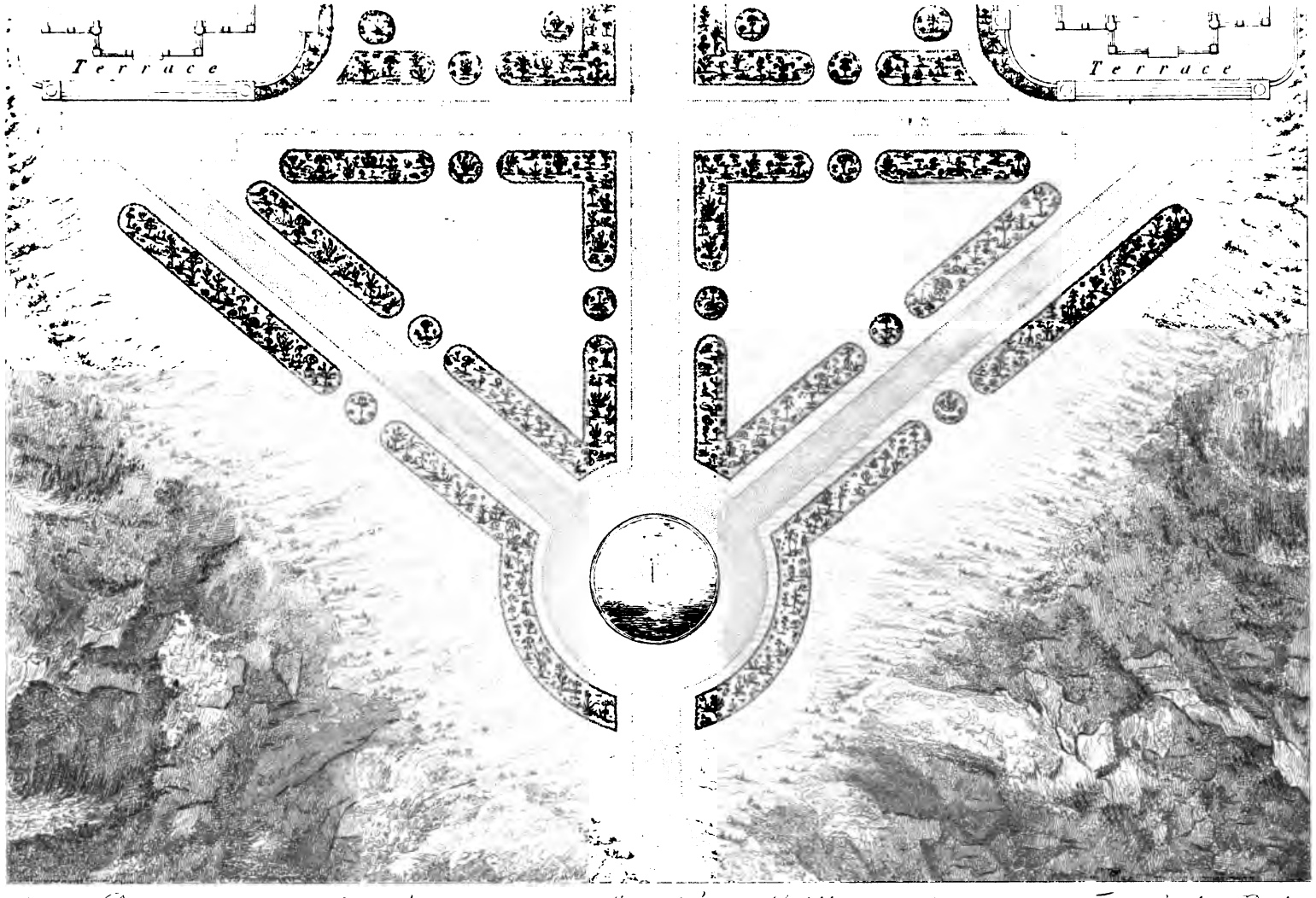

Ground Plan & Elevation of the Conservatory at Syon House, Middlesex, with a plan of the Flower Gardens & Rockery.
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Alstroemeria Pelegrina

Amaryllis Hyacinthina

Amaryllis Calyptrata

Cyrtanthus Obliquus

Botanical Register Vol. 1854.

London. Published by Orr & Smith. Amen Corner Paternoster Row.

PLAN OF THE WORK.

THE present edition of Miller's Gardener's Dictionary has been planned and prepared with the express purpose of making it an easily accessible, readily consulted, and complete book of reference, on all subjects connected with rural economy; to country gentlemen, gardeners, planters, farmers, and all who take an interest in the soil and its produce. For this purpose it will contain, not only full and accurate accounts of all cultivated plants, and of the modes of their culture, according to the best practical experience, but also of all those collateral branches of natural or of general science, which bear upon the grand subjects of cultivation, and are necessary parts of the instruction of a successful cultivator. In order that readers may turn at once to the information which they seek, the whole will be arranged in strict alphabetical order; and while the connexion will be preserved, every article will be complete in itself. The principal departments will be the following:—

GARDENING AND AGRICULTURE.

The practical details will embrace the subjects of gardening and agriculture in all their departments, useful and ornamental, the old as well as the newest modes of management, all of which, as far as possible, will be brought to the two important though independent tests of experience and of science. The scientific details, will be derived from the best ascertained facts in vegetable physiology and chemistry, more particularly the recent discoveries of the continental botanists; while the practical information will, in almost every instance, be derived from, or tested by the experience of the writer of the article.

PLANTING.

The earlier editions of this work have always been considered the best authority upon planting, and, with a very few exceptions, they still are so. The most important of these exceptions is the novel mode, founded upon science, of transplanting large trees, as introduced by Sir Henry Steuart, Bart., and now extensively practised in landscape gardening. This, and all other improvements, will be given with as much fulness as possible.

VEGETABLE ANATOMY AND PHYSIOLOGY.

This, though of so much importance, was but briefly treated in the previous editions, and indeed could not well be otherwise, from the paucity of facts, and the vagueness of the then existing

theories. We shall avail ourselves of every accurate discovery, domestic or foreign, which has been made on this branch of the subject; and we trust that with this and the original communications of our own contributors, we shall be enabled to render this important branch both interesting and instructive.

BOTANY.

As it is our intention, conformably to the plan of the original edition, to enumerate all the known genera of plants, and the greater number of the species, we shall give the botanical descriptions in smaller type, in order, since it is so very extensive, that it may not take up the space to be devoted to practical matters. Cryptogamic plants, being often important in practical investigations, such as the smut and the red-rust of corn, will be carefully described; while in all the descriptions, plainer language, and fewer technical terms, will be employed than is usual in botanical works.

METEOROLOGY AND THE WEATHER.

Those subjects, which are of great interest to every cultivator, were included in several of the early editions of Miller, but they have been rather unaccountably omitted in the more recent ones edited by Martyn and Don. In this one they shall be restored with every improvement that science and experience can impart.

INSECTS AND OTHER DESTRUCTIVE ANIMALS.

No subject is less understood among practical men than the depredations of insects, so universally and erroneously ascribed to some mysterious and non-existent thing termed a *blight*. This important subject will be fully investigated and explained, from facts easy to be ascertained, which will lead the cultivator to adopt rational modes of prevention.

DOMESTIC ANIMALS.

It is intended that this department shall comprehend the natural history and the best modes of management of all the animals kept for utility or pleasure, whether these be quadrupeds, birds, fishes, or insects. The nature and modes of treatment of these will be pointed out, upon the principle of their value and susceptibility of improvement, as subjects of rural economy.

DAIRY FARMING AND GRAZING.

These interesting subjects will be amply detailed by practical contributors of science and experience; and the processes of butter-making and cheese-making, as based upon the principles of chemistry, will be explained.

DISORDERS OF ANIMALS.

Our work would be imperfect without a full account of the disorders which so often attack domestic animals, with the most effectual remedies for each. We have secured most able assistance in this department, so as to give a very complete though concise view of Farriery and Veterinary practice.

RURAL STATISTICS.

The various agricultural reports of the Counties composing the Empire are so voluminous as to be out of the reach of the greater number of purchasers, while many of them are now old, and partly obsolete. We shall make every exertion to obtain the latest and most accurate information for this portion of our work, collected, in all possible cases, upon the spot; and here we earnestly solicit communications from resident gentlemen who take an interest in their several localities.

RURAL ARCHITECTURE AND ENGINEERING.

We do not intend under these heads to give treatises on Architecture and Engineering, but we deem it indispensable in a work like this to notice such structures and operations as are connected with Gardening, Agriculture, or Planting, from the apiary, the arbour, and the dovecot, to the conservatory, the farm offices, and the farm house; from the draining of a garden to the digging of a fish pond, or the embankment of a river.

CALENDAR OF MONTHLY OPERATIONS.

Under the name of each month we shall detail the chief rural operations which fall to be performed—a mode of instruction which has been popular and approved of from the time of Evelyn.

To ensure sound practical and scientific information, the several departments have been intrusted to writers of known ability and experience, who are requested to revise such articles in the original as are valuable, adding all modern improvements; to furnish new articles not contemplated in Miller's plan; and, as the work is intended for practical men more than for the learned, to write in as plain a style, and use as few technical or Latinised words, as may be practicable.

The following list of well-known contributors, to which daily additions are making, is respectfully submitted to country gentlemen, gardeners, and farmers, as no inconsiderable guarantee for the character of the articles.

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J. STEWART, Esq.
Professor of Veterinary Medicine in the Andersonian University, Glasgow.

ANDREW URE, M.D., F.R.S., F.G.S.
Author of the Dictionary of Chemistry, &c. &c.

* We regret to say that death has deprived us of a valuable contributor in this gentleman. We retain his name in our list, however, as previous to his death he had prepared articles, which will appear in their places.

MILLER'S DICTIONARY.

A, in the composition of botanic terms, is the Greek *a*, privative, and signifies "without;" as *a*petalous means "without petals," *a*phyllous "without leaves," *a*caulis "without stem," or "stemless." [A. C.]

AARON'S BEARD. The *Rhus cotinus*.—AARON'S ROD. The *Phlox paniculata*.

ABALUM. A term used by Adanson for the genus *Helonias*. [A. C.]

ABAMA. A term used by Adanson and others for the genus *Narthecium*. [A. C.]

ABATIA, Ruiz and Pavon (named after Pierre Abat, professor of botany at Seville). Abat's Flower. *Icosandria Monogynia*, Linnæus; *Tiliaceæ*, Jussieu. Calyx with a short somewhat top-shaped tube, having the throat beset with hairs, limb four-parted; lobes lance-shaped; no petals; stamens about twenty; filaments flat; seed-organ globular, one-celled, covered with long loose hair; capsule one-celled, two-valved, many-seeded, opening at the top; leaves on leaf-stalks, opposite; flowers clustered.—Ruiz et Pav., Syst. p. 135; Prod. T. 14.

1. Small-blossomed Abat's Flower (*A. parviflora*, Ruiz). A shrub from Peru: the leaves flat above; the anthers roundish; propagated by cuttings, and grown in peaty loam.—Kunth. N. G., Tab. 486.

2. Wrinkled Abat's Flower (*A. rugosa*, Ruiz). A shrub from Peru: the leaves wrinkled above, and the anthers oblong: propagated by cuttings, and grown in peaty loam.—Ruiz et Pavon, Tab. 14. [A. C.]

ABBREVIATED (in Latin, *Abbreviatus*). A term used to indicate that one part is shorter than another; as *abbreviated perianth* is meant to describe a calyx much shorter than the corolla. [A. C.]

ABBREVIATIONS. For the purpose of shortening botanical descriptions, some authors, as Linnæus and Willdenow, contract the terms, as *Cal.* for *Calyx*, and *Cor.* for *Corolla*; while others, particularly Trattinick, have invented for the same purpose a species of hieroglyphics. The only effect of both is to save space in writing or printing, an advantage which is far overbalanced by the trouble of ascertaining or recollecting the contractions, or of studying the hieroglyphics. We have therefore deemed it important to have all the botanical descriptions in this work free from contractions and hieroglyphics, so as not to puzzle the reader at every step of his progress.

The following are a few of the abbreviations most common in botanical works.

Anth.	Anther.	*H.* or *Hab.*	Habitat.	*Sem.*	Semina or Seeds.
Br.	Bractea.	*Hort.*	Hortus.	*Stam.*	Stamens.
Char.	Character.	*Ic.*	Icon or Engraving.	*Stig.*	Stigma or Summit.
Cl.	Class.	*Infl.*	Inflorescence.	*Sp.*	Species.
Cult.	Culture.	*Nat.*	Natural.	*Syn.*	Synonimes.
Div.	Division.	*Ord.*	Order.	*T.* or *Tab.*	Tabula or Picture.
Ess.	Essential.	*Ov.*	Ovary.	*Trib.*	Tribe.
Fam.	Family.	*Ped.*	Peduncle.	*Var.*	Variety.
Fil.	Filament.	*Pet.*	Petal.	*V.*	Vidi, or I have seen.
Fl.	Flower.	*Pist.*	Pistil.	*V. s.*	I have seen a specimen.
Fol.	Folium or Leaf.	*Rad.*	Radix or Root.	*V. v.*	I have seen it living.
Fr.	Fruit.	*Ram.*	Ramus or Branch.		[B. E.]
Gen.	Genus.				

ABDOMEN. In veterinary anatomy, the belly. It is the largest cavity in the body, and is chiefly occupied by the organs concerned in digesting the food. Its boundaries, or walls, are formed by muscles, bones, membrane, and skin. [C. S.]

ABDOMINAL APONEUROSIS. Upon raising the skin of the belly in a horse or a cow, and proceeding to examine the muscles, we find them covered, in their whole extent, by a dense, yellowish, and highly elastic membrane: this is the abdominal aponeurosis. It adheres very firmly to the muscles, and is attached to the floating

ribs on either side. Its power is so great as to enable it, with but little assistance from the muscles, to support the contents of the belly; while its elasticity is such, that it can perform its functions under all the various degrees of distension to which the abdomen is subject; and its power is greatest when it is most wanted, namely, when it is put upon the stretch by undue distension. Its muscles cannot remain long in a state of unremitted action; and were it not for the assistance which those of the abdomen derive from this elastic untiring expansion, they could not support its ponderous contents for more than a few minutes. [c. s.]

ABDOMINAL HERNIA, or RUPTURE. In veterinary surgery, the protrusion of some portion of the contents of the belly through an accidental opening on the surface. This disorder is often met with in horses and cows, occasionally in sheep, but rarely in smaller animals. The infliction of a smart blow by a blunt instrument, such as a cow's horn, or a horse's foot, may be sufficient to cause a partial separation of some of the fibres of the abdominal muscles, and yet leave the skin entire. In such cases, a portion of intestine, more or less, according to the extent of the opening, makes its escape from the belly, and forms a swelling without heat or pain, which may be instantly reduced by pressure with the hand, but which as instantly reappears when the pressure is removed. If the injury, and consequently the protrusion, have been trifling, no inconvenience may be suffered; for, in general, a process commences by which the protruded bowel adheres to the edges of the opening; and thus a permanent swelling remains, which feels hard or soft, according to its contents; tense or relaxed, according to the general distension of the belly; and which alternately rises and falls a little as the animal fills and empties its chest. Little can be done for a hernia of this description unless it have taken place very recently, and be attended to before the sides of the opening are rendered incapable of coming together by their own elasticity. Surgical assistance, indeed, is rarely sought in such cases, the tumour being often so trifling as to be discovered only by accidental observation.

In many instances the same causes produce a much more serious affair. One of the causes, as we have already hinted, is a blow: but rupture may also be produced by sudden and violent exertion, as in leaping, falling, backing a heavy load, or in struggling under a painful operation. While the animal is making an extraordinary effort, the top of the windpipe is closed, the chest is fully expanded, the capacity of the belly is diminished, the abdominal muscles are in a state of violent contraction, and, during the compression of the bowels, some portion of them is forced through a slender or weakened part of the walls. It is not always a portion of intestine, however, which forms the hernial tumour. In cows and sheep it is often the paunch or caul (*omentum*) which protrudes. (See HERNIA.)

When the hernial tumour is large, and appears suddenly, it attracts attention not only from its size, but also from its affecting the animal's general appearance. The animal becomes dull, unwilling to move, or, perhaps, is slightly attacked with colic; the swelling feels cold; and, if it be neglected, obstruction, strangulation, inflammation, and death, will succeed each other in a few hours. The veterinary surgeon will, in such cases, go promptly to work: he will give copious injections of warm water; he will apply cold to the tumour; he will introduce his hand up the vent gut (*rectum*), and, cautiously and gently groping for the artificial orifice, he will endeavour to draw in the protrusion, while an assistant aids him by external pressure. After the gut has been replaced, he will apply a broad and tight roller, with a pad over the opening, so as to guard against re-displacement. He will order absolute rest, spare diet, and, probably, half a dose of some opening physic; and he will likewise request that the bandage and pad be adjusted as often as they shift, and that this, and every thing else, be done with as little annoyance to the animal as possible.

Occasionally the protruded bowel passes some distance from the orifice between the skin and the abdominal muscles, and that to such an extent as to produce an enormous swelling. The treatment of such a case is more difficult; but, as in the other case, it resolves itself into the returning and retaining of the gut. In most instances, it is necessary to place the animal on its back, with its hind quarters elevated, and its hind legs drawn up to some support above. By little and little, the contents of the swelling, and then the bowel itself, are returned. A roller may be applied in such a way as partially to cover the opening, and thereby retain each little portion as it is replaced. Otherwise the treatment will be the same as that already described. Fever and inflammation, should they arise, must be checked by the means prescribed under these heads.

Foals are more especially liable to abdominal hernia; and in them it is frequently very difficult to retain the gut after it has been reduced. In old cases it is almost impossible by the ordinary means. In two cases, however, we have been successful, by adopting a painful, but still an effectual, mode of treatment. After replacing the intestine, merely by external pressure, the skin was drawn together, and a piece of fine catgut tied as tightly around it as possible. In a few days the catgut ligature and skin came away together, leaving a sore which healed under the ordinary treatment for a common wound. [c. s.]

ABDOMINAL MUSCLES. Those muscles are so called which form the lower and lateral boundaries of the belly. There are four pairs. Their uses are, to assist in expelling the air from the chest; to evacuate the contents of the bladder and bowels; to prevent the spine from bending too much downwards; and in females they powerfully assist the womb (*uterus*) during labour. They are likewise called into action during vomiting, coughing, sneezing, and rumination. [c. s.]

ABDOMINAL RING. This is an opening into the cavity of the belly, formed by a separation of the tendinous fibres of one of the abdominal muscles called the internal oblique muscle. In the entire male, the spermatic and blood vessels pass through the abdominal ring, in their way to and fro between the cavity of the belly and the testicle. In females the round ligament of the womb (*uterus*) passes through a similar opening. [c. s.]

ABELE TREE (*Populus Alba*). White Poplar, or Dutch Beech, otherwise called the Arbeel. The Abele is a tree of very rapid growth, but seldom exceeds forty or fifty feet in height when it has attained to maturity. The

leaves are large, and divided into three, four, or five lobes, which are indented on their edges. They are of a darker colour on their upper side, and very white with a dense down on their under. The foot-stalks are about an inch in length. The young branches have a purplish bark, and are covered with a white down, but the bark of the older branches and trunk is grey. In the beginning of April the male flowers, or catkins, appear, which are cylindrical, scaly, and three inches long; and about a week after the female flowers come out on catkins, which have no stamens like those of the male. Soon after the female catkins come out, the male catkins fall off; and in five or six weeks after the female flowers will have ripe seeds inclosed in a hairy covering, when the catkins will drop, and the seeds will be wafted by the winds to a great distance.

Abele Trees.

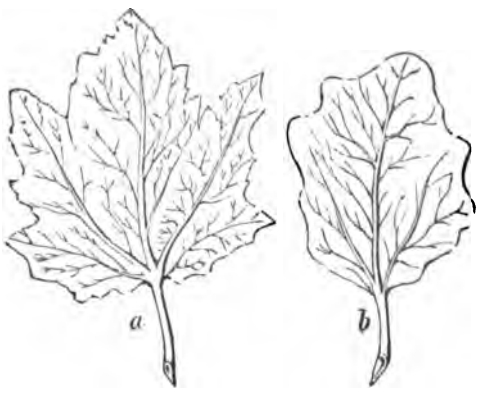
Hartlib, in his "Complete Husbandman," 1659, states that some years ago, there were ten thousand Abeles at once sent over into England from Flanders, and transplanted into many counties. He farther remarks, that the timber is incomparable for all sorts of wooden vessels, especially trays; and that butchers' trays cannot be made without it, it being so exceedingly light and tough. The finest Abeles are stated to have grown at Hartwell, near Aylesbury in Buckinghamshire, the seat of Sir William Lee, Bart. They were remarkable for their height, and the cleanness of their stem or bole.

"A specimen of their advance," says Evelyn, "we have had of an Abele tree at Sion, which being lopped in Feb. 1651, did, by the end of October 1652, produce branches as big as a man's wrist, and seventeen feet in length. As they thus increase in bulk their value advances likewise, which, after the first seven years, is annually worth one shilling more. The Dutch, therefore," he continues, "look upon a plantation of these trees as an ample portion for a daughter." As there has been much difference of opinion respecting the species which the Dutch cultivate as the true Abele, we sent over to Holland, in 1830, for specimens of the true Abele. This, when examined, proved to be precisely our Abele (*Populus alba*). In the Bath Memoirs, we are informed that at Seething, in the year 1760, truncheons or poles of the Abele, ten or eleven feet long, were planted on a bank thirteen feet broad, with water on each side at about five feet from the ground; and that one of them, when the account was taken, measured five feet to five feet nine inches in circumference, while the rest of the trees were tall and flourishing. Besides the uses of the wood before stated, it is considered good for wainscoting, for floors, laths, and packing cases, and, from the boards of it not splitting by nails, but closing over the heads, it is esteemed superior to deal for the latter purpose. It is found to answer for works under water. Peaty and low damp soils are the most proper for the Abele, and in these it is well worthy the attention of the forest planter. It should never be planted near the margins of nor in grass fields, for it extends its roots under the grass to a great distance, and sends up numerous shoots injurious to pastures or lawns.

The Abele is propagated by layers, cuttings, and off-shoots or suckers. It has been objected that trees reared from suckers are more apt to reproduce these than when raised from layers or cuttings; but, in the course of pretty long experience and observation, we have never observed any difference in this respect to arise from either of these modes of propagation, the trees reared from cuttings apparently producing as many runners and suckers as those from off-shoots or layers. If cuttings are adopted, they should be from two to three feet long, inserting them in a moist light soil to the depth of a foot and a half; and it is better to plant them in a gentle slanting direction than in an upright position. If the season prove dry, the beds or rows should be judiciously refreshed with water when necessary. The month of February is the best season for planting the cuttings. In two years many, if not all that have rooted, will be fit to plant out for good on the sites where they are to remain for timber. It often happens that a portion of the cuttings root strongly the first year, in which case it is a good practice to take them up in the following spring, and to transplant them into nursery rows to remain until strong enough for final transplanting. The size of the plants considered the best for final transplantation, is from one and a half to three feet in length, but much larger plants will succeed very well by paying proper attention to keep the roots as perfect as possible. When suckers are employed, they should be separated from the parent roots in October, at the fall of the leaf. The thick portion of the parent root that generally is attached to the sucker should be taken off entirely, or reduced as much as possible, leaving only the fibres attached to the lower part of the sucker. The plants should then be planted into nursery rows for two or three years to make fibrous roots and healthy stems. Layers are seldom had recourse to, but their treatment is the same as that required for suckers.

In the former editions of this work the Abele is made a variety of the Grey Poplar (*Populus canescens*), and several British as well as foreign botanists have sometimes confounded the two species, but they are very distinct. The pistils of the female flowers in the Abele are four, on egg-oblong catkins, while in the Grey Poplar the pistils are eight, on cylindrical catkins; but the distinction between the trees is most obvious to common observation in the habits of each. The Grey Poplar rises with a clear round stem and silvery bark, crowned

with compact branches, forming a pretty regular rounded outline; whereas the Abele has a branched stem with grey bark, the branches long, comparatively spreading and scattered, exhibiting an irregular outline frequently tending to the spiral, but nearer to the rounded, figure of the top of the Grey Poplar. On a nearer inspection the leaves offer clear characters of distinction. In the Abele the leaves are lobed and toothed, dark green and smooth above, and snow white with dense down beneath; while those of the Grey Poplar are scarcely half the size, are roundish and deeply waved, and hoary with grey or whitish down beneath. [D. S.]



Leaf of the Abele. Leaf of the Grey Poplar.

There are many varieties of the Abele, arising from local circumstances, the branches in some being thick and straight, in others flexible and pendent; the leaves in some more, in others less acute, in some covered on the under side with a very thick white cottony down, in others only sea-green, and almost smooth and shining; and the catkins in some long and slender, in others thick and short. The variety called on the Continent *Polan de Holland*, is preferable for avenues and for landscape gardening, from its rapid growth, its majestic height and aspect, and from its fine white leaves contrasting well with the green of other leaves. We observed some magnificent ones near the Hague, and more particularly extensive avenues of them along most of the highways in the lower districts of Belgium, near Bruges and Ghent. It is so common on the romantic banks of the Rhone, that some French authors call it *arbre du Rhône*.

Hanbury very properly disapproves of planting truncheons, and differs a little from Mr. Sinclair with respect to the planting of cuttings. "I by no means approve," he says, "of the planting of truncheons, as has been often practised on boggy places; because I have always observed that plantations of these luxuriant trees attempted to be raised in this manner, have been frequently stunted, and very unpromising; and that the most promising trees have never equalled, in goodness or beauty, those planted with regular trees raised in the nursery. The latter end of October is the best season for planting the cuttings, though they will grow if planted in any of the winter months. They should be all of those last year's shoots which have been vigorous, or at least not older than two years' wood. These cuttings should be one foot and a half in length; and must be planted in the nursery ground in rows a yard asunder, and at a foot and a half distance from one another. They should be planted a foot in the ground, while the other half must remain to send forth the leading shoot. Now in order to have one leading shoot only, in summer these plants should be carefully looked over, and all young side branches nipped off, in order to encourage the leading branch. After this, no farther care need be taken of them than keeping them clean from weeds, and digging between the rows in the winter, till they have attained a proper size to be planted out."

According to M'Intosh, the best cuttings are taken from the wood of the preceding year; and when made, each cutting should be nine inches in length, and planted in nursery lines eighteen inches apart, and the cuttings about six inches distant from each other. When inserted in the ground, they should be put in deep enough to resist the drought; and if only two inches of the top appear above ground, it will be found sufficient. In two years, or three at most, these cuttings will be fully grown to fit them for being finally planted out; but if they are to remain the third year in the nursery, they ought to be taken up and replanted at a greater distance. The Abele often sends up naturally vast numbers of suckers from its roots, and such are sometimes used for young plants; cuttings are, however, preferable. Langley asserts that he has known great quantities produced by chips only, where the trees have been hewed after felling; and one of our earliest authors has proposed ploughing down these slips, with a view to produce an economical coppice.

Amongst other uses of this tree, it may be mentioned that, on the Continent, the wood of the larger branches is prized on account of its lightness, for making wooden shoes; while the smaller twigs are used for fire-wood, though, from being deficient in carbon, they give but little heat. By splitting the wood into thin shavings, like tape or braid, the stuff called *sparterie*, used for hats, is manufactured. These shavings are always made from green wood. One workman can, with the aid of a child to carry off the shavings, keep several plaiters employed.

The thick white cottony envelope of the seeds has been used in manufacturing paper; and it has also been proposed as a substitute for cotton in calico manufacture. Pallas, in his Travels, speaks very sanguinely of the probable success which would attend the trial of the latter, and we agree with him that it is much finer and more silky than any species of cotton; but, from a careful examination of a quantity which we gathered in 1832, in the island of Tingamaten, near Rotterdam, we are clearly of opinion that the pile is far too short ever to render it eligible to be spun into good yarn. Since great quantities of it, however, could be had, as Pallas informs us, from Siberia, it would be probably worth a trial in some sorts of manufacture.

It may not be out of place to mention, that the ancient Greek athletæ wore crowns made of the branches of this tree, because it was sacred to their patron deity, Hercules.—*Julius Pollux, de Ludis.* [B. E.]

ABELIA, R. Brown; *Didynamia Angiospermia*, Linnæus; *Caprifoliaceæ*, Jussieu. Abel's Shrub. Calyx an oblong tube, limb two or five-parted, leafy; corolla tubular, funnel-shaped, five-lobed, lobes egg-oblong; stamens

four, equal or unequal; stigma headed; seed-organ three-celled, two cells with many abortive seeds, the third cell with one fertile seed; leaves on leaf-stalks, tooth-nicked.—R. Brown, Cor. et Desc. pl. Abel., 1818.

1. Chinese Abel's Shrub (*A. Chinensis*, R. Brown). A shrub of China, from the province of Kiang-Si to the lake Po-Yang: tooth of the corolla five-ribbed, with four ribs approximating, the fifth remote; fence two-flowered, flower-stalks three-forked; seed-organ sometimes one-ribbed, sometimes five-ribbed; leaves egg-oblong, very thin, and downy.

2. Three-flowered Abel's Shrub (*A. trifoliata*, R. Brown). A shrub of the higher mountains of India, from the north-west to Kamaon, where it is commonly called *Kumki*: flowers pale carnation, in bundles of three, with three lateral flower-scales; calyx five-parted; leaves egg-lance-shaped, taper-pointed.—R. Brown, in Wall. Pl. As. rar., p. 14, T. 15.

3. One-flowered Abel's Shrub (*A. uniflora*, R. Brown). A shrub or tree of China: flowers solitary, with eight flower-scales.—R. Brown, in Wall. Pl. As. rar., p. 15. [A.C.]

ABELMOLUC (from the Arabic, *Ab-el-moluk*). The castor-oil plant (*Ricinus communis*). [A. C.]

ABELMOSCHUS (from the Arabic, *Ab-el-mosk*, "grain," or "seed of musk"). 1. A name of the *Hibiscus abelmoschus*, the seeds of which are of a very musky odour, and are used in Arabia and Egypt in coffee to render it more agreeable. 2. A section of the genus *Hibiscus*. [A. C.]

ABERDEENSHIRE. This is one of the most extensive counties not only of Scotland but of Great Britain; measuring in length 85 miles, and in breadth 40. Its area is not less than 1950 miles, or 1,248,000 English acres, somewhat more than one-third of which is under cultivation. It is bounded eastwardly by the German Ocean for 60 miles, that corner of it being also the north-east extremity of the island; then by the counties of Kincardine, Angus, and Perth, on the south; and by those of Inverness, Moray, and Banff, on the west. It contains three royal burghs; Inverury and Kintore, which with some others, not in the county, return a member to Parliament; and Aberdeen, which by the Reform Act has obtained the right of electing a representative for itself, the county being entitled to another. Aberdeenshire is composed of 85 parishes, and is usually divided into five districts. 1st, Marr, by far the largest of them, and one of the most barren. Braemar, the highland part of this division, has few mountains under 3000, whilst several are 4000 feet above the level of the sea. 2nd, Formartin, of which the land on the coast is fertile, but hills and mosses abound near the interior. 3rd, Buchan, next in extent to Marr, which claims above 40 miles of the coast; and though presenting a bold rocky front to the sea, has generally a flat surface, which has been greatly improved. 4th, Garioch, naturally very fertile, and that which in former times was termed the granary of Aberdeen. 5th, Strathboggie, for the most part a hilly district, containing also a great deal of moor and moss; improvement in agriculture here, though late in beginning, has nevertheless made good progress. The inland part of the county is in general wild, barren, and mountainous, though the eye is frequently relieved by large forests of natural wood, which clothe the sides of the hills. The shapes, and the various groupings of the mountains, have been only imperfectly investigated; but, with an exception or two, it may be said that they do not spring in an abrupt manner from the plains, but gradually rise from their bases; and, whilst they press upon each other, increase in altitude as they recede from the German Ocean.

Waters.—The principal rivers are the Dee and the Don; the Dee being by far the largest, though, as regards the fertility of the neighbouring shore, it cannot rank with the Don. There are also the Ythan and Ugie within the county, and the Deveron and Boggie on its north-west boundaries; but from their rapidity and scantiness none of all these waters are navigable. There are several lakes in Aberdeenshire; as also chalybeate springs; one at Peterhead is very powerful as a tonic.

Climate.—Aberdeenshire experiences a mildness of temperature in winter greater than most parts of the island, with the exception of its mountainous districts; being neither so cold in winter nor so warm in summer as Middlesex. It may, indeed, be taken as a pretty general rule, that when the snow is one foot deep at Aberdeen, it is nearly two at Newcastle-upon-Tyne. The great disadvantage attending the climate is the lateness of the spring, owing to the frequent fogs and rains along the German Ocean at that season. In autumn, too, heavy dashes of rain often fall, which require exertion and skill from the husbandman that English farmers know nothing of. Wheat, however, and all the other crops cultivated in Scotland, come to perfection here; and, as regards healthiness, the fact that many of the inhabitants live to a great age may be conclusive. The population, besides, leads to the same conclusion; in 1811 it was 135,073—in 1821 it was 155,387—and in 1831 it was 177,651.

Estates.—There are estates belonging to several noblemen and gentlemen in this extensive county, that have been in the possession of their families since the days of King Robert Bruce. Perhaps not more than one-fourth has changed proprietors since the Union with England. Probably the same proportion is held under strict entail. Landed property in Aberdeenshire, and, indeed, throughout Scotland, consists either in superiority of what is possessed by others, or in actual possession of lands which hold of the crown; in vassalage, which holds of a subject superior, or in burgage tenure, which holds of the magistrates of a royal burgh. Here by far the greatest number of proprietors are of the most respectable class of real freeholders, who reside on their own estates, and promote the happiness of their tenantry, and the improvement of their lands. There is, of course, a vast disparity as respects the size of estates. These may be said to decline regularly from those whose valuation amounts to many thousands annually, down to that of a hundred pounds, and even much less.

Roads, Canals, and Harbours.—No county in the kingdom has expended money more liberally on roads of every description. Three hundred miles of turnpike have been made at no distant period, at an average of £350 per mile; and intermediate roads to above a thousand miles in length. Even in Braemar, fifty miles from the shore, where there are no turnpikes, the roads are excellent; whilst the new streets and bridges of Aberdeen are beautiful, masterly, and most expensive works. There is a canal all the way from the harbour at Aberdeen to Inverury, in length 18¾ miles; and the altitude surmounted, from low water mark to the summit level, is 168

feet. Since it was opened in 1807, the benefit thereby conferred on the country through which it passes has been infinite, though not to the shareholders. Lime, coal, and manure, are, on a great scale, conveyed inland by this facility, and it bids fair to be of still more important service. The harbour at Aberdeen now, with its docks and extensive appendages, is one of the finest in the kingdom, and commands a large share of trade. It is calculated that it exports goods coastwise and to foreign parts to the value of not less than £1,200,000 sterling, while the imports are valued at £600,000. Indeed, when the Peterhead and Newburgh ports are taken into account, Aberdeenshire may be called a maritime county. The Greenland whale fishery is a branch that is most successfully pursued from these ports: nor should the regular communications held by means of steam boats with London, Edinburgh, and Inverness, be unnoticed, which have done, and promise still to do, more to lay open the north-east of Scotland to improvements, than any other institution or enterprise, however great.

Markets and Manufactures.—There is a great number of fairs and trysts in Aberdeenshire annually; and well-frequented weekly markets in the principal towns. As to manufactures, the county has long ago been celebrated. After the making of certain kinds of cloth which found a market in foreign parts, came the knitting of stockings, a business which fifty years ago brought such immense sums of money as to raise the rent of the land above a third part beyond its former price. This branch, however, in its turn gave way to others in wool, flax, and cotton, which have called in the aid of machinery to a great extent. The whole manufactures give employment to about 4000 hands. There are four large woollen manufactories, three of which are moved by water, and the other, which is the most extensive, by steam. The linen manufacture, particularly that of thread, is carried on in all its branches to a great extent. There are several breweries, in which porter and ales are made; and considerable quantities are annually exported to America and the West Indies. There are also several distilleries, the number of which was increased on the reduction of the duty on spirits. There are in the county, besides, large iron works, as also establishments for making tapes, paper, sailcloth, and other manufactures, all in active and extensive operation.

Fuel.—Fifty years ago the chief fuel in Aberdeenshire was peat, a very expensive material in such a quarter, on account of its distance from the most populous parts. Now, pit coal from Newcastle, or the neighbourhood of the Firth of Forth, is generally used in all places within twenty miles of the shore. Peats are becoming more expensive, the mosses being nearly exhausted. In the Highlands, however, considerable quantities of wood are consumed, mixed with turf from the moors. In the peat mosses, a species of highly resinous fir is found, which, when dried and peeled, makes good fagots, its light being steady and clear. Small round pieces of moss, strongly impregnated with sulphur, are also to be met with in some places, which are used by the peasants for kindling their fires, and for giving light.

Minerals.—Upon the whole, Aberdeenshire is not rich in mineral productions. There is a good deal of limestone, but the scarcity of coal renders this material of little avail. Slate quarries, to a small extent, are wrought; manganese is found near to Aberdeen, and black lead in the neighbourhood of Huntly. Quartz also, particularly in Buchan, is met with, and in large masses of several tons each. The high mountains of Braemar contain rock crystal of various kinds, which the country people call cairngorm. Numbers, even whole families, flock thither in summer in quest of such gems, and frequently find purchasers from London. The granite of Aberdeenshire, which is famous for building bridges and wharfs, as well as for paving, is the most valuable mineral production; 12,000 tons annually being exported to London and elsewhere.

Fisheries.—All the streams and lakes of Aberdeenshire have such fish in them as are common in Scotland; some of the lakes have also char: but the salmon fisheries at the Dee and Don are chiefly important; their produce, some years ago, was £35,000 per annum. An excellent scalp of mussels is occasionally found at the mouth of the Ythan; a considerable number of pearl mussels have been also discovered at its lower extremity. One of the pearl jewels of the ancient crown of Scotland, it is said, was found here.

Rates and Tiends.—There are no poor's rates in Aberdeenshire, though, by the law of the land, such assessments may be levied. The clergy of Scotland are placed in that mediocrity which calls on them to look for the respect of their people, from the purity of their morals and their intellectual attainments. There are parishes in the county in which the tiends, or tithes, do not amount to £150 yearly; but a late Act of Parliament has raised all such stipends to that sum as the minimum. It may not be uninteresting to notice, that there is a strong leaning to episcopacy in Aberdeenshire; the Roman Catholics also are more numerous in some of its districts than in any other quarter of Scotland.

Agricultural Societies.—In the different divisions, and even inferior districts of the county, there are agricultural societies; those at Aberdeen, Alford, Buchan, Garioch, and Kincardine O'Neil, may be named. The Highland Society has done, and is doing, much for it, whilst the proverbial natural quickness and sagacity of the people lead them to enterprises and conquests in the useful arts not yet dreamt of. The habits of industry that prevail among the lower orders, and which may be referable to the early rise of manufactures in this part of Scotland, tend to surmount vast impediments. With regard to agriculture, it may be said that the exertions made, in spite of the savage nature of much of the country, have fully borne out the character bestowed upon the inhabitants.

Agriculture and Farming.—Few things are more difficult than to give such a description of soils as to convey any precise ideas to those for whom it is intended; especially in such a general and short outline as this. In Aberdeenshire there are various kinds of clay, varying from the hard and tenacious soil, which is found more generally in the division of Buchan, to a friable clay, which is to be met with in the other districts. It may be remarked that the soil on the hills and mountains, as well as on the fields, is uniformly deeper on the north than on the south sides. When cultivated, there is land in this county that yields rich crops, though in its natural

state it was sterile and most forbidding. Indeed, nowhere has there been greater perseverance to overcome wild nature. The farmers trench with spade and mattock, with a skill perhaps unknown elsewhere. It must be confessed, however, that the farms, especially in the more central parts, are too small, at least if compared with those in the best farmed counties. Yet agriculture has been very considerably advanced within these few years, even in the less accessible parts.

With regard to leases, the most usual term is nineteen years. As this is the period of Metonic cycle, at the end of which the moon returns to her former place in the heavens, it has been supposed that such a number of years included all the variety of seasons. Several heritors have granted leases of thirty or thirty-three years, with increase of rent at the end of every tenth or eleventh year, a highly beneficial arrangement for the agriculture of the county. But it would appear that feudal ideas still dictate, in a considerable degree, the covenants in the leases of Aberdeenshire. Rents are generally paid in money, and average (with the exception of the vicinity of the city of Aberdeen) for arable lands from thirty to fifty shillings per acre. The crops cultivated are chiefly oats, and bear or bigg: wheat has also spread rapidly in the improved districts, and, indeed, all the crops in repute amongst enlightened farmers. Besides the common sorts of manure, the refuse of whale blubber is used; but it is not a durable article, though it quickly and minutely divides the particles of the soil. It is usual to mix it with dung from the stable-yards, as otherwise it would be difficult to cart it without waste. Sea dogs, after the fishers have taken out their livers for oil, are used for the same purpose, a powerful and cheap manure for poor land. Sea weed is also used to a considerable extent. These articles are, of course, confined to the neighbourhood of the coast. It is to be regretted, however, speaking generally of the great mass of small farmers here, that little attention is paid either to the best means of increasing, or mode of making up dunghills. The implements are incomparably better than they were half a century ago; but still Aberdeenshire is, as must be the case, a good deal behind more favourably situated districts. Farm-houses and offices were not long ago in a wretched condition here; they are gradually improving; but whilst landlords, as some of them still do, think they act most liberally by allowing a year's rent for building a complete set, or some such unbusiness-like arrangement, it is clear that the most enlightened principles are not established in this particular, and that the first style of accommodation cannot be thus gained. There is, of course, still less regard shown for the convenience and comfort of cottagers. From granite being so near at hand, stone fences prevail. Stone, backed by turf, is in frequent use. One great defect is observable in Aberdeenshire—that of belts of wood, even where nature herself teaches how rapidly they would grow. The advantage of such shelter to the crops in bare regions would be immense, not to speak of the economy of cultivating plantations.

In Aberdeenshire there are 400,000 acres of heath, on its bounding mountains and elsewhere, and 40,000 of benty moor; whilst of meadow land, properly so called, there is not probably much more than 4000 acres. From the manner in which the mountains press upon one another, the soil toward their bases is either mossy or marshy; or the district is too remote to encourage the forming of a regular meadow. Such stupendous elevations are not generally let by measure, a right of pasturing on them being enjoyed in common by all those who possess arable land in the neighbourhood. Even those who have an exclusive right to the pasturage of certain portions rent them as bounded by the hills or mountains, and not according to any known measurement. As to sown grasses, it may be said that they are now extensively and skilfully cultivated in this breeding county: whilst irrigation, which even under the old husbandry was frequently practised, is by a few individuals conducted to a considerable extent, and according to regular improved principles.

Aberdeenshire is a breeding county, which raises a greater number of black cattle than perhaps any in Scotland: the number is stated at 110,000. The dairy, however, is not a distinguished branch here: and as to sheep and goats, not one fourth part of the number of former times is reared. It ought not to be overlooked that wild red deer, in flocks sometimes of three hundred, are to be met with in Braemar. As regards horses, beside the common Highland pony, there is the Clydesdale breed, with an intermediate sort between these two breeds, which is reared in the county. This sort is distinguished for agility and hardihood.

Landscape Gardening.—In this extensive county there are the venerable remains of once celebrated edifices. The Dun-o-Deer, built on the summit of a beautiful conical hill, is said to have been the residence of Gregory the Great, who died in 892. The ruins of two ancient buildings, supposed to have belonged to King Malcolm Canmore, are still pointed out; one of them in a rocky island in Loch Kanders, the other at Castle Town of Braemar. The ruins of Kildrummy Castle cover nearly an acre of ground. There are also ancient castles, some of them still inhabited, and modern mansions of great beauty, with their corresponding parks. But the large forests of natural wood are still more imposing in point of grandeur than any of the efforts of man. 124,160 acres, it is computed, are under wood, of which one-third may be plantation. The district of Marr abounds in that which is natural, and is so well adapted to the growth of trees that it is only necessary to shut out the cattle, and the birds and winds supply it with seeds that soon rise into vigorous plants. These woods consist chiefly of Scots fir, and the timber of the full-grown trees, which are of stupendous height, fit for the masts of the largest ships, is reckoned superior to any imported from the north of Europe; yet, from the difficulty of having such masses of material conveyed to accessible parts, they are in a great measure useless. The chief seats are Invercauld House, with its pine forest; Monymusk, with its extensive plantations; Den of Rubislaw, with its curious terraces; Slaines Castle; Marr Lodge; Aboyne Castle; Pitfour; Keith Hall; Huntley Lodge; and Castle Forbes.

Orchards, Nurseries, and Gardens.—This county is generally situated in so high a latitude as not to be calculated for producing the finest fruits. But in the neighbourhood of Aberdeen there is a numerous body of gardeners, and nurserymen, who raise all sorts of roots, so as even to export considerable quantities of plants

to England. The gardens of people of rank present every thing that skill and money can command in such districts; but neither as regards these, nor the kail yards of the peasantry, can anything striking be told.

Upon the whole, Aberdeenshire presents capabilities, and possesses a race of people, which, to judge from what has already been accomplished, must satisfy every inquirer that it will ever continue to figure prominently among the counties of Scotland. [E. A.]

ABERRANT (in Latin, *Aberrans*). Not conformable to, or wandering from, usual structure or organisation. The term is often applied theoretically. [B. E.]

ABIES, Salisbury (supposed to be from the Greek, *'απιος*, a pear tree, the cones being pear-shaped). The Fir. *Monœcia Monadelphia*, Linnæus; *Coniferæ*, Jussieu. Flowers in single catkins; male flowers with the stamens blunt; anthers two-celled; female flowers with thick woody scales, tiled, and enclosing the seeds; pistil two-three-parted; seed-leaves three to nine.

The firs are well known timber trees, and distinguished from the pines and larches by being more pyramidal in form, and by the leaves rising singly around the branches from a membranous sheath. They all exude turpentine, which is employed in various arts, and in medicine as a stimulant.

I.

LEAVES SOLITARY, AND SCATTERED EQUALLY ROUND THE BRANCHES.

1. A. alba. 2. A. nigra. 3. A. orientalis. 4. A. rubra. 5. A. excelsa.

1. White Spruce Fir (*A. alba*). An evergreen timber tree, fifty feet high, from North America in 1700: leaves solitary, flat, four-cornered, bent inwards; flowers, without petals, from May to June; cones sub-cylindrical; scales egg-oblong, entire; propagated by seed in sandy loam. *Pinus alba*, Lambert, Pin. 39, T. 26.

2. Carpathian Spruce Fir (*A. Carpathica*, Hort. Trans.). A timber tree from the Carpathian mountains: flowers, without petals, in May; propagated by seeds in sandy loam.

3. Clanbrazil Spruce Fir (*A. Clanbrasiliana*, Hort. Kew.). An evergreen ornamental shrub, four feet high, supposed by Mr. Lambert to be a variety of *Abies nigra;* propagated by layers in the common garden.

4. Douglas Fir (*A. Douglasii*, Hort. Trans.). An evergreen timber tree, fifty to ninety feet high, from North America in 1829: leaves spreading equally, deep green like the yew, whitish beneath, blunt; flowers, without petals, in May; cones pendulous, egg-oblong, with rather uneven cartilaginous scales, much shorter than the flower scales (*bracteæ*), which are remarkably three-toothed, the lateral teeth being membranous, with intermediate lateral cones, much longer and more rigid; propagated by seed in sandy loam. *Pinus Douglasii*, and *Pinus taxifolia*, Lambert.

5. The Norway Spruce Fir (*A. excelsa*, De Candolle). A most valuable timber tree, 100 feet high, from the north of Europe in 1548: leaves somewhat four-cornered; flowers, without petals, in April; cones pendulous, cylindrical, with blunt, wavy, and slightly toothed, scales; propagated by seed in sandy loam. *Abies communis, Pinus Abies*, Lambert, Pin. 37, T. 25.

Var. a. Variegated-leaved (*foliis variegatis*). A variety, cultivated as an ornamental shrub.

6. Warty Fir (*A. Menziesii*, Lindley). An evergreen timber tree, forty feet high, recently from California: leaves short, stiff, and very deciduous; cones oblong, three inches long; scales thin and saw-toothed; buds egg-oblong, sharp pointed, and covered with resin; branches, when the leaves fall, warty; propagated by seed in sandy loam. *Pinus Menziesii*, Douglas and Lambert.

7. Black Spruce Fir (*A. nigra*, Pursh). An evergreen timber tree, forty to fifty feet high, from North America in 1700: leaves four-cornered, straight, upright; flowers, without petals, in May; cones pendulous, egg-shaped; scales, somewhat waved at the edge, and jagged. Lambert, 41, T. 27.

8. Oriental Fir (*A. orientalis*, Willdenow). An ornamental evergreen tree, thirty feet high, from the Levant in 1825: flowers, without petals, in May; cones, egg-shaped, cylindrical, with rhomboid entire scales; leaves surrounding the branches, square. *Pinus orientalis*, Lambert, 45, T. 29.

9. Red Spruce Fir (*A. rubra*). An evergreen timber tree, fifty feet high, from North America in 1755: leaves surrounding the branches, awl-shaped, pointed; flowers, without petals, in May, reddish, oblong, blunt; the scales rounded, slightly two-lobed, very entire on the edge; propagated by seed in sandy loam. *Pinus rubra*, Lambert; Pin., 43, T. 28.

II.

LEAVES FLAT, SOLITARY, AND NOT SCATTERED ROUND, BUT POINTING SOMEWHAT IN TWO DIRECTIONS.

1. A. balsamea. 2. A. Canadensis. 3. A. Picea. 4. A. dumosa. 5. A. Smithiana.

10. Balm of Gilead Fir (*A. balsamea*, Willdenow). An ornamental evergreen tree, fifty feet high, from Virginia in 1696: leaves silvery beneath; flowers, without petals, in May; cones oblong, erect, and purple; scales entire; crest of anthers horned; propagated by seed in sandy loam. *Pinus balsamea*, Lambert, Pin. 50, T. 31.

11. Canada Silver Fir (*A. Canadensis*, Hort. Kew.); or Hemlock Spruce Fir. An ornamental evergreen tree, twenty-five to thirty feet high, from North America in 1736: leaves downy, toothed, somewhat leaning two ways; flowers, without petals, in May; cones very small, hardly larger than the leaves, and egg-oblong; scales even and entire; seeds small; propagated by seed in sandy loam. *Pinus Canadensis*, Lambert, Pin. 50, T. 32.

12. Bushy Silver Fir (*A. dumosa*, Lambert). An ornamental evergreen tree, twenty feet high, from Nepal in 1820: leaves all turned one way, saw-toothed towards the point, with a milk-white bloom beneath; cones terminal, erect, blunt, very small, with lax, egg-oblong, very blunt scales; flowers, without petals, in May; the leaves fall early, and are easily shaken off; propagated by seed in sandy loam. *Pinus Brunonia*, Wallich, Plant. As. Rar., vol. iii. p. 24, Tab. 247.

13. Great Silver Fir (*A. grandis*, Douglas). An evergreen timber tree, from California, 150 feet high: flowers, without petals, in May; cones four inches long, upright, oblong, and somewhat bent; scales broad and downy; flower scales (*bracteæ*) much shorter than the scales, with two lobes; propagated by seed in sandy loam.

14. Hairy Silver Fir (*A. hirtella*, Humboldt). An evergreen ornamental tree, twenty-five feet high, from Mexico: flowers and cones unknown; leaves more than an inch long, flat, acute, with a sea-green bloom beneath, and growing in two rows; young branches hairy.—Kunth., Nov. Sp. p. 5, T. 11.

15. Noble Silver Fir (*A. nobilis*, Douglas). An evergreen forest tree, eighty feet high, from California: cones six inches long, upright, and oblong; outer scales long, wedge-shaped, bent back, and stiff pointed; inner scales broad and round; leaves numerous, and of the same colour on the upper and under surface. *Pinus nobilis*, Lambert.

16. The common Silver Fir (*A. Picea*, Willdenow). An evergreen timber tree, thirty feet high, from Germany in 1603: leaves solitary, flat, a little inclining to one side; flowers without petals in May; cones cylindrical, erect; flower scales (*bracteæ*), longish, erect; anthers two, horned; cones without footstalks; the scales very blunt, with fringed teeth at the sides. *Pinus picea*, Linnæus; Lambert, T. 30. *Pinus pectinata*, De Candolle.

17. Sacred Silver Fir (*A. religiosa*, Humboldt). An evergreen ornamental timber tree, forty feet high, from Mexico: flowers unknown; cones almost black, and like those of the Cedar of Lebanon, but smaller; leaves sharp-pointed, covered with a sea-green bloom, and growing in two rows; young branches smooth. *Pinus religiosa*, Lambert, T. 43.

18. Siberian Fir (*A. Sibirica*, Lambert). The *Pinus Sibirica* and *Pinus Richta* of our gardens. According to Linnæus, Lambert, and others, it is the same as the *Abies Aricea*, but little is known concerning it. Gmelin describes it as a native of all parts of Siberia as far as 58° north; but it is generally found in mountainous regions in the upper country, lying between the Irtisch and Ob, where it forms dense woods.

19. Indian Silver Fir (*A. Smithiana*, Wallich). An evergreen forest tree of great size, from Northern India: cones six inches long, egg-oblong, upright, and brown, with a sea-green bloom; scales even and rounded; seeds small; leaves slender, angular, dark green, and whitish beneath. Wallich, Pl. As. Vol. iii., T. 246.

20. Tall Nepaul Fir (*A. spectabilis*, Lambert). An evergreen timber tree, ninety feet high, from Nepal in 1822: flowers, without petals, in May; cones upright, oblong, blunt; scales even and rounded; leaves silvery beneath, notched at the top, and nearly all pointing one way. *Pinus Webbiana*, Wallich; Lambert, T. 44. [A. C.]

ABIESINEÆ, or *Abietineæ*, Richard. A division of the *Coniferæ*, embracing all the genera whose female flowers are reversed, and whose fruit is a truly scaly one, as *Abies*, *Pinus*, and *Larix*. [A. C.]

ABIETIC ACID. In vegetable physiology, a resinous acid recently procured from turpentine by M. Caillot, and also by M. Baup from the resin of *Abies excelsa*. It reddens the tincture of litmus. By the aid of heat it is soluble in alcohol, ether, and naphtha. It loses five per cent. of its water when it combines with alkaline or other bases. [B. E.]

ABIETINE. In vegetable physiology, a chemical principle extracted by M. Caillot (*Ess. sur les Tcréb. et Journ. de Pharm.* 1830, p. 438) from turpentines. There was found 10·85 parts of abietine in the turpentine of *Abies picea*, and 11·47 in that of *Abies excelsa*. It crystallises in pyramidal needles, whose base is almost a quadrilateral rectangle. The crystals are grouped in the form of roses, stars, and the like. Abietine is without smell or taste, scarcely resinous, liquefies in the sun's rays, and has no action on tincture of litmus or syrup of violets. When melted it forms a transparent liquid, which becomes white and opaque, like styracine procured from liquid storax. It is insoluble in cold water, but melts in hot water. It is soluble in alcohol at 34°, in boiling alcohol, in sulphuric ether, in naphtha, and in concentrated acetic acid. [F. D.]

ABILDGAARDIA, Wahlenberg (named from Professor Abildgaard). Abildgaard's Grass. *Triandria Monogynia*, Linnæus; *Cyperaceæ*, Jussieu. Small grassy-looking plants, differing from *Cyperus* in having the scales of the flowers placed in two tiled ranks, by the seeds being pointed, and by the three-sided base of the style.

1. One-spiked Abildgaard's Grass (*A. monostachya*, Wahlenberg). A green-house perennial, six inches high, from New Holland in 1819: flowers, without petals, from June to August; one-spiked; propagated in bog earth by division.—Sloane's Jamaica, vol. i. p. 79.

2. Three-spiked Abildgaard's Grass (*A. tristachys*, Wahlenberg.) A green-house perennial, one foot high, from New Holland in 1824: flowers, without petals, from June to August; spikes three; propagated in bog earth by division.—[A. C.]

ABLANIA, Aublet (from one of the species being called by the Caribbees in Guiana, *Goulongon-ablani*). *Polyandria Digynia*, Linnæus; *Tiliaceæ*, Jussieu. Aublet's Tree. Calyx four to five-parted; no petals; stamens numerous, with the filament unconnected, and the anthers roundish; seed-organ egg-shaped; styles two, forked; capsules four-valved, one-celled; valves covered on the outside with stiff bristles; seeds numerous.—Aubl. Guian., i, 585, T. 234.

1. Finger-leaved Aublet's Tree (*A. digitata*, Sprengel). A stove or hot-house tree, about forty feet high, native of Rio Grande in Brazil: leaves saw-toothed, fingered, smooth, shining above; leaflets oblong; flowers in bundles.

2. Guiana Aublet's Tree (*A. Guianensis*, Aublet). A native tree of Guiana, growing in the woods to about fifty feet high: leaves oblong, waved; flowers in bundles.—*Albania laurifolia*, Persoon; *Trichocarpus laurifolius*, Willdenow. —Lamb. Ill., T. 479; Aubl. Guian., i. 585, T. 234. [A. C.]

ABNORMAL (Latin, *Abnormis*). Unusual, as when any departure takes place from the ordinary structure. Thus, in *Nicotiana multivalvis*, the seed organ having many cells instead of two, is unusual or abnormal. [A. C.]

ABOLBODA, Humboldt. A small genus belonging to *Restiaceæ*, containing two foreign species (*A. pulchella*, and *A. imberbis*); characterised by flowers in heads; husk tiled, one-flowered; corolla three-lobed; pistil three-cut; capsule three-valved, and many-seeded.—Humb. et Bonpl.; Rœmer et Schulter., Syst. [A. C.]

ABOMASUM. The fourth or digestive stomach of animals that chew the cud or ruminate. [C. S.]

ABORTION. In veterinary surgery, miscarriage, slipping, slinking, casting, or warping, all meaning the expulsion of the fœtus from the womb (*uterus*) at so early a period of pregnancy as to render it impossible for it to live.

The immediate causes appear to be the death of the fœtus, or derangement in the functions of the womb or its dependencies, arising from some external cause or causes operating on the mother. Amongst these operating causes may be reckoned too much or too little food producing plethora or emaciation, sudden fright acting on the nerves, or sympathy with certain smells or sights, such as the smell or sight of blood, of bones, of horns, and particularly of the aborted fœtus of another animal, on a similar principle, perhaps, to that which causes even some strong-nerved men to faint away, as we have seen, on witnessing a surgical operation. Accidents, also, such as falls, bruises, over-driving, or fatigue, and the like, may frequently bring on abortion.

The signs of approaching abortion are great languor, uneasiness, and restlessness; sometimes a discharge of bloody matter from the vagina, and the sudden filling of the udder, similar to the signs of approaching parturition. [B. E.]

Abortion in the Horse.—Abortions very frequently happen among mares. This often arises in consequence of over exertion during the latter period of pregnancy. Mares are liable, also, very frequently, to various accidents in their pastures, which may be the cause of their slipping their foal, such as kicks, tumbling into holes and ditches, over-exerting themselves to get over fences, and the like. On this account, when a mare is near her time, she should be kept by herself, in some convenient place. But there is another, and, we suspect, a very general cause of these accidents in mares; we mean a stinting of them in their food, either in quantity or quality. It appears, indeed, that some imagine that the mare, when she is in foal, may be turned out almost any where: but this opinion is ill founded; for although the mare does not require to be kept so high in condition as when she is at hard work, yet she is not to be turned out into a pasture where she may be in a manner starved: but how often do we see the mare-in-foal on the worst piece of ground in the whole farm, exposed, during the rigorous winter season, to endure the cold, as well as to put up with scanty food. Every well-informed farmer knows that the slinking of the foal is often the consequence of such treatment. On the other hand, when the mare is not worked at all, and indulged with too high keep, she is almost equally in danger of abortion, her high condition having a tendency to cause inflammation and other disorders; and these deranging the reproductive organs, frequently produce miscarriage. It would seem, then, that moderate exercise and diet are best suited as means to avoid the misfortune of the premature exclusion of the foal. [G. L.]

Abortion in the Cow.—Abortion occurs oftener in the cow than in all other domestic animals put together. Perhaps it is one of the greatest annoyances the proprietor of cows has to encounter; and unfortunately, for aught

we see to the contrary, it is likely so to continue. For in spite of the improved state of veterinary medicine, and the researches of skilful veterinary surgeons, both at home and abroad, abortion still continues as frequent and annoying as ever. The causes are frequently involved in obscurity; but it may be mentioned, that an extremely hot and foul cowhouse, a severe blow, violent exertion, starvation, plethora, an overloaded stomach, internal inflammations, constipated bowels, bad food or water, improper exposure, and the like, will now and then produce abortion. Anything whatever, indeed, that seriously affects the health of the animal in general, or the state of the reproductive organs in particular, may do so. But abortion occurs again and again when no such causes as those enumerated can be traced. The disease, if such it may be called, as we think it may, is even said to be infectious. No sooner does it show itself in one animal than it is seen in another, and another, till it has spread over the most part of the cowhouse. Some say this is to be attributed to the odour arising from the things evacuated. Possibly it may be so. There is nothing unreasonable in the supposition; for although we cannot perceive the smell, nor account for its peculiar influence, it is still quite within possibility that such an odour does exist, having the power attributed to it. But of this there is no proof; neither is it explained where the odour comes from that makes the first cow miscarry. There can be no great harm, however, in acting as if we were assured that the mischief has its origin in the source so commonly supposed, provided we do not shut our eyes to any other which accident or investigation may reveal. In the meantime, the number of abortions may be diminished by carefully avoiding all those causes which are known to be capable of producing it. It may be right, too, to guard against those which are merely suspected, at least those that are rationally suspected; for it is not needful to torture or bribe old women to remove the effects of their incantations. Let the cows be regularly fed; let their food be good, and in proper quantities; let them have water as often as they will take it; avoid sudden exposure to cold or heat; and, above all, let the cowhouse be well ventilated. Prohibit all manner of rough usage on the part of those who look after the cows, whether they be pregnant or not. If any of them accumulate flesh too rapidly, gradually reduce their allowance; and, on the other hand, if any become emaciated, discover the cause, and remedy it, always by slow degrees. Sudden changes in the matter or mode of feeding should also be avoided. The same sort of diet does not agree equally well with all the cows; and this, in general, is indicated by undue relaxation, or constipation of the bowels: this should be watched, and removed at once. Attention to these, and many other minor circumstances, will amply repay the proprietor for the little additional trouble.

"That improper or too little food," says Mr. Lindsay, "is a prominent cause of abortion, is strongly indicated by the following facts. A friend of mine, a respectable grazing farmer, kept a dairy of twenty-two cows, ten of which slipped calf at different periods of parturition. The summer had been very unfavourable in every respect, both as regarded the ground where the cows were pastured, and in getting in the hay crop. He had little or no hay of the last year's growth, and the hay of that year when cut into was in a very bad state; but as he had no other, he was obliged to give it to his cattle. The consequence was as mentioned above; and besides, many of his stock died of various disorders; and many of those which recovered remained long weakly."

"The most common cause of abortion in cows," says White, "is improper feeding during the winter and spring, before they are turned to pasture. The filthy pond water they are often compelled to drink, and feeding on the rank fog-grass of October and November, especially when covered with hoar frost, are likewise frequent causes of miscarriage. I remember a farm near Berkeley, in Gloucestershire, which afforded a striking proof of the injuries of stagnant pond water, impregnated with dung and urine. This farm had been given up by three farmers successively, in consequence of the losses they sustained through abortion in their cattle, their not being in season (that is, not conceiving), red water, and other diseases. At length a Mr. Dimmery, after suffering considerably in his live stock for the first five years, suspected that the water of his ponds, which was extremely filthy, might be the cause of the mischief. He therefore dug three wells upon his farm, and having fenced round the ponds to prevent his cattle from drinking there, caused them to be supplied with well water, in stone troughs erected for the purpose; and from this moment his live stock began to thrive, became uncommonly healthy, and the quality of the butter and cheese made on his farm was greatly improved. It should be observed, that on this farm the cattle were regularly fed with good hay during the winter, and kept in good pasture in summer; so that there cannot exist a doubt that the losses sustained by Mr. Dimmery were entirely attributable to the unwholesome water the animals were compelled to drink.

"In order," adds Mr. White, "to show that the accident of warping may arise from a vitiated state of the digestive organs, I shall here notice a few circumstances tending to corroborate this opinion. In January, 1782, all the cows in the possession of farmer D'Euruse, near Grandvilliers, in Picardy, miscarried. The period at which they warped was about the fourth or fifth month. The accident was attributed to the excessive heat of the preceding summer; but as the water they were in the habit of drinking was extremely bad, and they had been kept upon oat, wheat, and rye straw, it appears to me more probable that the great quantity of straw they were obliged to eat in order to obtain sufficient nourishment, and the injury sustained by the third stomach in expressing the fluid parts of the masticated mass, together with the large quantity of water they probably drank while kept upon this dry food, was the real cause of their miscarrying. A farmer at Charentin, out of a dairy of twenty-eight cows, had sixteen slip calf at different periods of gestation. The summer had been very dry, and during the whole of this season they had been pastured in a muddy place, which was flooded by the Seine. Here the cows were generally up to their knees in mud and water, and feeding on crowfoot, rushes, and the like. Part of the stock had recently been brought from Lower Normandy, where they had all been affected with indigestion by feeding upon lucerne, from the effects of which they had been relieved by the operation of paunching. In one, the opening made was large enough to admit the hand for the purpose of drawing out the food; the rest were

operated on with a trocar. In 1789, all the cows in the parish of Beaulieu, near Mautes, miscarried. All the land in this parish was so stiff as to hold water for a considerable time; and as a vast quantity of rain fell that year, the pastures were for a long time, and at several periods, completely inundated, on which the grass became sour and rank. These, and several other circumstances which have fallen under my own observation, plainly show that keeping cows on food that is deficient in nutrition, and difficult of digestion, is one, if not the principal, cause of their miscarrying. It is stated by Mr. Handwin, that feeding in pastures, when covered with white frost, has been observed to occasion abortion in these animals."

If there be any probability of a cow miscarrying from exposure to any of the common causes already enumerated, let her by all means be put apart from the others; and let a skilful person attend to the evil from which she is expected to suffer. If the approach of abortion be evident, bleeding may be had recourse to; for if it do not check abortion, it will yet do no harm though it take place. When there are any premonitory symptoms of abortion, they are precisely the same as those which present themselves in ordinary labour, with the exception of their being less marked.

Fumigation of the cow-house is resorted to as one of the means of preventing the spread of abortion: tar, sulphur, gunpowder, feathers, and the like, are burned for the purpose of destroying the odour. We have never seen a single instance of the practice being attended with the smallest success; while it is obvious that, if carried beyond a certain point, it may produce the very evil it is intended to remove or mitigate.

It is a remarkable feature in the history of this complaint, that those cows that have once miscarried are particularly liable to do so again at the same period of their succeeding pregnancy. Greater care is therefore requisite to guard against those causes which do or are supposed to excite it.

The treatment of abortion, when it does take place, differs not from that recommended under PARTURITION, only that the cow which miscarries should be removed with all that belongs to her from among pregnant cows. [C. S.]

If the signs of approaching abortion be discovered early, the accident may sometimes be prevented. If the cow is in good condition, then immediately let it be bled to the extent of five or six quarts, and the bowels opened with half a pound of Epsom salts, three or four drams of aloes in powder, or as many ounces of castor oil, administered in a quart of gruel; but if the cow is in very poor condition, and the miscarriage is anticipated from her having been exposed to cold, it would be more advantageous to avoid bleeding, and give her a warm gruel drink, with an ounce of laudanum in it. If after this abortion does take place, let her be kept in a comfortable place by herself; and if the after-birth has not passed off, let no injudicious and unnecessary administration of violent forcing medicines, such as capsicum or hellebore, be given. Nature, with a little assistance, is generally equal to the perfect restoration of the animal. [G. L.]

Abortion in the Sheep. Ewes are much subject to abortion, in consequence of the numerous accidents they are liable to, such as fright, overdriving, being worried or run with dogs, a remarkable instance of which came under our own observation. A pack of hounds, in pursuit of a hare, got among a flock of sheep belonging to a farmer, and so hurried and alarmed them, that thirty out of a flock of two hundred ewes prematurely dropped their lambs. It is the same in sheep as in the other cases of domestic animals,—scarcity of food, and exposure to severe cold, having a great tendency to make the ewes prematurely drop their lambs, or produce them weakly and crippled at the full time; and although there may be a little danger in giving too much food, such as allowing them to feed all the winter on turnips, the danger is trifling compared with the starving system. [G. L.]

ABORTIVE. A term applied by gardeners and farmers to flowers, seeds, and fruits, which do not come to maturity, in consequence of external injury from the weather, from insects, or other causes affecting their growth. Thus fruit often becomes abortive, in consequence of cold winds or frosts in spring checking the flow of the nutritive juices; and after losing its healthy colour shrivels, and falls. The same effects arise when the leaves of fruit branches are devoured by caterpillars, or the fruit stalks sucked by insects (*Aphides, Cocci*, &c.) The only preventives are sheltering from cold, and destroying the insects. [B. E.]

ABORTIVE CORN. Mr. Tillet asserts, that indications of abortion in corn are observable long before harvest when the stalk is not above eighteen inches high, and may be known by a deformity in the stalks, the leaves, the ears, and even in the grain.

The stems of abortive corn plants are generally shorter than those of healthy ones of the same kind and age. They are crooked and knotted, the leaves being commonly of a bluish green colour, curled up in various forms; sometimes turned like wafer cakes, and often rolled in a spiral form. The ears have very little of their natural form, but are lean, withered, and show very imperfect rudiments of either the chaff or grain.

These appearances are, however, only to be observed in plants that are highly diseased. The stalks are often pretty straight, the leaves but little curled, and the chaff tolerably well formed; but instead of enclosing a small embryo, white and soft at the summit, there is only a green kernel, terminating in a point, not unlike a young pea when forming in its pod.

These abortive grains have two or three very visible; and are formed in a manner as if two or three were formed at the base. When they are ripe, or rather when dried up, they grow black, and resemble the seeds of cockle so much, that farmers who are not acquainted with this distemper often confound abortive wheat with the seeds of this weed. It is supposed by Mr. Tillet, that this is occasioned by perforations of insects. [H. F.]

ABRADED (from the Latin, *Abrado*, "I shave off"). When any part has the appearance of being rubbed or worn off. [A. C.]

ABRAHAMIA, De Candolle. A section of the genus *Trembleya*.

ABROMA (from the Greek α, privative, and βρωμα, "food," as if unfit for food). Fives. *Polyadelphia* and

Decandria, Linnæus; ***Byttneriaceæ***, Jussieu. Calyx five-parted; petals five, with dilated claws; cup of the stamens with five segments, each bearing three anthers; pistils five; capsule five-celled; seeds winged.

1. Smooth-stalked Fives (*A. angusta*, Hort. Kew.) A stove tree, ten feet high, from the East Indies in 1770: leaves seven-angled; petals egg-oblong, spear-shaped; flowers axillary; branches without prickles; flowers in August, purple; propagated by seed and cuttings in peaty loam. *Abroma angusta* and *A. Whileri* of Willdenow; *A. fastuosum*, Jacquin.

2. Prickly-stalked Fives. (*A. fastuosa*, Hort. Kew.) A stove tree, ten feet high, from New South Wales in 1800; adult leaves with simple hair beneath; wings of the capsules somewhat blunt at the end; branches prickly; flowers, from June till October, purple; propagated by seed or cuttings in peaty loam.

3. Soft-leaved Fives (*A. mollis*, De Candolle). A stove tree, about ten feet high, native of the Moluccas and Java: adult leaves heart-shaped, taper-pointed, saw-toothed, velvety, with short, soft, crowded down, and starry bristles; lower leaves roundish, heart-shaped, rather five-lobed; flowers dark purple; propagated by seed or cuttings in peaty loam. [A. C.]

ABRONIA (from the Greek, *αβρος*, "soft, delicate"). *Abronia*, Jussieu; *Pentandria Monogynia*, Linnæus; *Nictagyneæ*, Jussieu. Bird's-eye Flower. Corolla funnel-shaped, with heart-shaped segments contracted above the seed-organ, bulging at the orifice; pistil simple.

1. Umbelled Bird's-eye Flower (*A. umbellata*, Jussieu). An evergreen perennial, 6 inches high, from California, in 1823. A very beautiful plant, not unlike the Bird's-eye Primrose; flowers, in April and May, red. Propagated by division in sandy peat. — *Tricratus admirabilis*, Delaune. — Hook. Ex., 194. [A. C.]

ABROTANUM (from the Greek *α*, privative, and *βροτος*, "mortal," because it never decays; or from *αβρος*, "soft," and *τονος*, "extension," from the delicacy of its texture). A name of the Southernwood or *Artemisia abrotanum*.

ABRUPT (in Latin, *Abruptus*). When the extremity appears as if it had been cut off, as in the leaf of the tulip tree (*Liriodendrum tulipifera*). [A. C.]

ABRUPTLY PINNATE (in Latin, *Abruptè pinnatum*). When there is neither leaflet nor tendril at the end, as in the *Orobus tuberosus*, and the genus *Mimosa*. (See the figure). [A. C.]

ABRUS (from the Greek, *αβρος*, "soft, delicate," from the extreme tenderness of the leaves). Rosary Pea. *Diadelphia Decandria*, Linnæus; *Leguminosæ*, Jussieu. Calyx indistinctly four-lobed, the upper lobe being the broadest; filaments nine, united at the base, opening at the back; pistil with the summit blunt; seed roundish, separated by cellular membranes.

1. Common Rosary Pea (*A. precatorius*, Willdenow). Jamaica Wild Liquorice. An evergreen climber, twelve feet high, from the West Indies in 1680, noted for its seeds, which are scarlet or white, with a black eye; flowers, from March to May, pale purple; grown in the stove, chiefly raised from seed, but cuttings will root in sand plunged in heat. [A. C.]

ABSCESS. In veterinary surgery, a circumscribed cavity in an animal, containing matter. The deposition of matter in a solid part of the body is always preceded, and in some degree accompanied, by inflammation. The local symptoms are, pain on pressure, heat, swelling, hardness, and, where it can be seen, redness. These are easily recognised, in proportion as the inflamed part is near the external surface. If the part in which an abscess is about to form be soft, yielding, and well supplied with blood, it soon softens and points, the pain diminishes, the skin becomes thin, a fluid is felt fluctuating under it, and by and by the skin bursts, or a portion of it drops out, and the matter escapes. What is called the process of granulation succeeds to this; and, provided the matter be completely evacuated, and the outlet be such as not to retain any that may form subsequently, the cavity soon fills up.

Such are the different stages of an ordinary abscess. The general health of the animal is rarely affected; but if an abscess form in a dense unyielding texture, in a part which cannot without much difficulty accommodate itself to an increase of volume, then the swelling may be less, but the animal will endure a great deal more pain. The irritation indeed is sometimes so great, from this cause, as to induce fever, and even death; and hence the formation of an abscess in the foot of an irritable horse is not an unfrequent cause of death. During the deposition of the matter in such cases, we have general symptoms added to those termed local. There is loss of appetite, thirst, a hot skin, quick and hard pulse, constipated bowels; in short, the animal is *fevered*. When an abscess forms in a part remote from the surface, its presence is not easily recognised. The general practitioner has here an advantage over the veterinary surgeon. The expressed feelings of the patient, and the occasional slight shivering fits which accompany the formation of matter, are guides which the veterinary surgeon can rarely or never command. The shivering, if it occurs, passes unobserved, and the animal can give no account of himself; dissection, therefore, sometimes reveals large abscesses, whose existence was not even suspected during life. Fortunately these are not frequent.

It is a curious circumstance, and one that well illustrates the preservative principle of a living being, that, unless there be some mechanical obstacle, as in the case of the horse's foot, the matter always seeks its exit by an external opening. If this were not a law in the animal economy, and if the matter were to spread indiscriminately on all sides, it might not only accumulate to an enormous extent, and produce much destruction, but by encroaching upon vital organs, it might be a very frequent cause of death. The instances of such a thing happening are rare; but they are easily accounted for by the presence of some mechanical obstacle which the absorbents could not overcome. Why an abscess should point at one part rather than another, is truly wonderful; but it is not more

so than almost every other process of importance in the animal economy. We may attempt to explain it; but in truth, to perceive that such is the case, and that because it would have been wrong had it been otherwise, is as far as we can proceed. We know that the absorbents remove a portion of that side of the cavity which is next to the external surface; but we do not know what urges them to act on that side in preference to any other; and, perhaps, in a practical point of view, we need not care to know.

The causes of abscess may in general be traced to an injury done to the texture of a part, or to the introduction of some foreign substance by which it is irritated. In the former, the formation of matter is a part of the process by which the injury is repaired; in the latter it becomes necessary to interpose a bland insensible medium between the surrounding parts and the irritating substance, while the same means serve to expel it. Thus a severe bruise, the insertion of a thorn, a nail, or any similar agent, may be followed by an abscess.

However irreconcilable, too, it may be with modern pathology, it is not the less true that, now and then, especially in horses, the formation of an abscess and evacuation of matter, are means by which the system expels something obnoxious to it. See STRANGLES.

The treatment of an ordinary abscess is very simple: as a general rule, the matter should be evacuated as soon as discovered. Let a broad-shouldered lancet be used, and let the opening be made sufficiently large; and, what is of still more consequence, let it be at the lowest part of the tumour, in order that the cavity may be completely and constantly drained. The general practitioner has some scruple about making an artificial opening, often for good reasons. His patients dread the lancet more than a tedious cure; while the skin is thinner, and consequently the natural outlet is sooner formed. But in the horse, and the dog, and still more in the ox, the skin is thick, its removal proportionally slow, and the natural process is both tedious and painful. It is, therefore, better both for the animal and his owners, to have an artificial outlet made for the matter as soon as it is known to exist. Little more is necessary than to keep the part clean; trim the hair from the edges of the orifice, and by applying hogs'-lard, prevent the acrid discharge from adhering to, and removing the hair from the skin beneath. Let no pretender stuff the cavity with a candle, or tent of tow, or rowels, or any thing else. All these interfere with nature's operations, prevent the escape of the matter, produce fistula and other evils, often far more serious than the original abscess. If the cavity do not fill up so readily as might be expected, allow the animal a little more nourishing food than that recommended for invalids; and inject once, or even twice a day, a liniment, composed of equal parts of spirits of turpentine and sweet oil; or if the matter discharged, instead of being thick, pale yellow, and without smell, be dark-coloured, variegated, and smell offensively, a solution of chloride of lime, or one to three drachms of nitre in six ounces of water, may be used.

A hernial tumour has been mistaken for an abscess; and, in consequence, the blacksmith has plunged a lancet into the gut, or inserted a rowel. This is a most unlikely mistake for a veterinary surgeon to make. The heat, the pain, the rigidity, and the situation of an abscess, would be sufficient to distinguish it from a hernial swelling. If there be met with a tumour without heat or pain, very compressible, elastic, and situated on the belly, the veterinary surgeon would pronounce it a rupture, or hernia; and of course would never dream of touching it with the lancet. [C. S.]

ABSINTHIN. In vegetable physiology, a bitter resin, discovered in Wormwood, by Kunsmuller, but which has not as yet been very minutely examined. [B. E.]

ABSINTHIUM (Greek *'αψινθιον*, from *α*, "not," and *ψινθος*, "pleasant"). 1. The common Wormwood (*Artemisia absinthium*). 2. A section of the genus *Artemisia*. [A. C.]

ABSORBENT SOILS. In gardening and farming, such soils as imbibe a great quantity of water.

ABSORBENTS. In veterinary medicine, those drugs are termed absorbents that are given internally for the purpose of neutralising any acid which forms in the stomach and bowels in consequence of impaired digestion. Prepared chalk is generally used for this purpose. Those medicines are likewise termed absorbents which are applied externally for absorbing moisture. Armenian bole, calamine, flour, and the like, are employed in this way. They are sometimes dusted between folds of the skin when galled, and raw from friction, blisters, or grease. They are likewise useful in canker of the horse's foot, foul in the foot of cattle, foot-rot in sheep, and sores between the toes of dogs; and they are beneficial in some forms of mange, in staying bleeding, and assisting the cure of a penetrated joint. [C. S.]

ABSORBENTS. In veterinary physiology, a class of vessels whose office it is to convey the product of digestion and the residue of nutrition into the circulation, to be mixed with and repair the waste of the blood. They are divided into lacteals and lymphatics. The former are all situated in the cavity of the belly; and by extremely minute mouths, opening on the inner surface of the stomach and intestines, they receive the nutritious portion of the food, and carry it to a vessel which runs along the left side of the spine, and which, in its turn, empties itself into the left jugular vein. The lymphatics are distributed over every portion of the frame, at least over every portion that contains blood. Their different branches are so minute and so numerous, that a celebrated anatomist who attempted their dissection, is said to have thrown down his knife in despair, exclaiming, "that the body is entirely composed of absorbents." The uses of the lymphatics are, to remove the residue of nutrition; and when the supply of food is deficient, to remove such portions of the body as can be spared and converted into blood. It is they that effect the removal of parts which disappear without the action of external agents. The lymphatics ultimately empty their contents into the same vessel as the lacteals; and they follow, in their distribution through the body, the same course as the veins. In the horse they are liable to a disease termed farcy; and in all animals they are frequently inflamed in the neighbourhood of a sore. The absorbents, both lacteals and lymphatics, are very delicate in their sides, nearly transparent, have numerous valves which compel their contents to flow only in one direction; and their larger trunks have numerous glandular bodies on them. The use of these glands is not well

known; but, from one or two circumstances, it would appear that they have to produce some change on the fluid which passes through them before it is fit to mingle with the blood. [C. S.]

ABSORPTION. An important process in vegetable physiology. As plants are not furnished with any individual organ similar to the mouth of animals, how, it may be asked, do they effect the introduction of food into their bodies? Is it by the general surface of their stem, leaves, or roots, or by any peculiar part of these? By whatever part it may enter, it must, at any rate, pass through the covering of the outer bark (*epidermis*), which the earlier physiologists thought it could not do, but by means of pores more or less visible. Yet some of them described the outer bark as being of so close and compact a texture, that the eye, aided even by the best microscopes, was unable to discover in it the slightest vestige either of pores or of apertures. But Hedwig and De Candolle detected superficial pores in the leaves, at least, of many plants; and so will any one else, who will be at the trouble of repeating their observations with lenses of similar powers.

The next difficulty was with regard to the outer bark (*epidermis*) of the flower, fruit, and root. No pores had been detected in the flower and fruit, though it was evident that they were refreshed and invigorated by the access of moisture and of atmospheric air; and no pores had been detected in the root, though it was evident that the whole of the nourishment which the plant derives from the soil must of necessity pass through the root. It was also evident that no aliment could be taken up by the plant, except in the state of a liquid, or of a gas—that is, by absorption or by inhalation, as the chyle is taken up into the animal lacteals, or the air into the cells of the lungs. The greediness with which plants absorb water was perceived and acknowledged even in the earliest times, and even by men who were not botanists. Anacreon, in one of his little trifles in honour of drinking, makes the very trees of the forest drink:

Ἡ γῆ μέλαινα πίνει
Πίνει δὲ δένδρὰ αὐτὴν.—Ode xix.

"The black earth drinks, and the trees drink it;"—

that is, the moisture which it contains.

By merely immersing in water a plant of almost any species of moss that has been some time gathered, or long exposed to drought, so as to have had its leaves shrivelled up, the moisture will immediately begin to penetrate the plant, which will thereby resume its original verdure; an experiment which proves the fact of the entrance of moisture into the plant through the outer bark (*epidermis*).

It might be doubted whether any of the moisture thus imbibed had passed through the root. But if the bulb of a hyacinth is placed on the mouth of a glass bottle filled with water, so as that the smaller roots (*radicles*) only shall be immersed, the water is imperceptibly exhausted, and the plant grows. The moisture must, consequently, have passed through the root. Plants seem, indeed, to be peculiarly well adapted for the absorption of fluids by the root, from the infinite number of little absorbent fibulous sponges (*spongiolæ*), in which the fine fibres of the root terminate. It is owing to this important property that the scientific gardener, in the transplanting of his young trees, or the scientific and ornamental planter, in the transplanting of his trees of full growth, is so extremely careful to preserve entire even the minutest fibres and extremities of the root. Sir Henry Steuart's *Planter's Guide* has taught him the great importance of these little organs.

Hales instituted a variety of experiments to show the absorbing power of roots, and the force with which it acted; as did also Duhamel and Marriotte, to show the absorbent power of leaves. But the most complete set of experiments upon the absorbent power of leaves is that of M. Bonnet of Geneva, whose main object was to ascertain whether the absorbing power of both surfaces of a leaf was alike. With this view he placed a number of leaves over water, so as that they only floated on it, but were not immersed; some with the upper surface and others with the under surface applied to the water. If the leaf retained its verdure the longest with the upper surface on the water, the absorbing power of the upper surface was to be regarded as the greatest; but if it retained its verdure the longest with the under surface on the water, then the absorbing power of the under surface was to be regarded as the greatest. Some leaves were found to retain their verdure the longest when moistened by the upper surface, and some when moistened by the under surface; and some were indifferent to the mode in which they were applied to the water. But the inference deducible from the whole, and deduced accordingly by Bonnet, was, that the leaves of herbs absorb moisture chiefly by the upper surface, and the leaves of trees chiefly by the under surface. What is the cause of this singular difference between the absorbing surfaces of the leaf of the herb, and of the tree? The physical cause might be the existence of a greater, or of a smaller number of pores, found in the leaves of the herb and tree respectively. The chemical cause would be the peculiar degree of affinity existing between the absorbing organs and the fluid absorbed. Duhamel seems to have been content to look to the physical cause, merely regarding the lower surface of the leaf of the tree as being endowed with the greater capacity of absorbing moisture chiefly for the purpose of catching the ascending exhalations which must necessarily come in contact with it as they rise, but which might possibly have escaped if absorbable only by the upper surface, owing to the increased rapidity of their ascent at an increased elevation; and regarding the upper surface of the leaf of the herb as being endowed with the greater absorbing power, owing to its low stature and the slow ascent of exhalations near the earth. This did not throw much light upon the subject; and the experiments were still deemed insufficient, as not representing to us the actual phenomenon of vegetation, though the fact of the absorption of moisture by the leaf is fully confirmed.

If, after a long drought, a fog happens to succeed before any rain falls, so as to moisten the surface of the leaves, plants begin to revive, and to resume their verdure long before any moisture can have penetrated to their roots. Hence it follows incontestably, either that moisture has been absorbed by the leaf, or that exha-

lation has been suddenly stopped by closing the pores of the leaf, or both (See STOMATA). The efficacy of rains themselves, and of artificial waterings, may be accounted for partly on the same principle; for they have not always penetrated to the root when they are found to have given freshness to the plant by either or both of the processes just alluded to. The moisture, then, that enters the plant as an aliment is taken up by means of the pores, or in default of visible pores, merely by means of the absorbent power of the outer bark (*epidermis*), not only of the root and leaf, but often, as it is to be believed, of the other parts of the plant also, at least when they are in a soft and succulent state.

By what means do the gases enter the plant? If water, or other non-elastic fluids, are capable of penetrating the outer bark of plants, whether furnished with visible pores or not, gases may well be supposed to be endowed with a similar capability. It might be asked, however, whether the water and the gases enter by the same pores, where pores are found to exist. Though there appears to be nothing absurd in the adoption of the affirmative, yet it seems probable that each has its own peculiar pores. At least, it is known, that some surfaces which repel moisture exhibit no evidence leading us to suppose that they repel the common air. This is well exemplified in the case of cabbage-leaves, in the time of rains and dews, when the drops roll along the upper surface without wetting it, or lodge in its folds like globules of quicksilver. This is the case, also, with fruits that are covered with bloom. It is probable, therefore, that all such leaves or vegetable surfaces as repel moisture, are fitted rather for the inhalation of air, which they have long been regarded as capable of effecting; and in times in which it was fashionable to look for analogies between the plant and animal, in everything whatever, leaves were even regarded as being the lungs of plants. Grew thought he had discovered in the leaves a number of little bags or bladders filled with air, supposed to have entered by inhalation; and the bags or bladders were supposed to be analogous in their office to the cells of the lungs of animals. M. Papin introduced into the receiver of an air pump an entire plant, root, stem, and leaf; but the consequence was that it very soon died. He then introduced a plant by the root and stem only, the leaves being still exposed to the influence of the air. The plant lived for a considerable length of time, whence he concluded that leaves are lungs. But these arguments are far from being sufficient to establish the fact in question; and we introduce them, not so much with a view to show their inadequacy, as to show that the doctrine, even if founded in truth, could not have been satisfactorily proved by any experiments that were practicable at that time.

It is to the modern improvements in pneumatic chemistry, and to them alone, that we are indebted for our knowledge of the real functions of the leaves of plants, and of their analogical resemblance to the lungs of animals, it being now proved indisputably that the leaves of plants not only contain air, but do both inhale and respire it. It was the opinion of Dr. Priestley that they inhale it chiefly by the upper surface; and it has been shown by Saussure that their inhaling power depends entirely upon the integrity of their organisation. A bough of *Cactus Opuntia*, detached from the plant and placed in an atmosphere of common air, inhaled in the course of a night four cubic inches of oxygen; but when placed in a similar atmosphere, after being cut to pieces and pounded in a mortar, no inhalation took place. The inhalation of air, therefore, is no doubt effected by the pores of the outer bark (*epidermis*) of the leaf.

Yet it may be thought that the subject is still enveloped in something of mystery, as no pores have been found in the outer bark of the flower or root, or of fleshy fruits, or bulbs, which, after all, will not thrive or ripen if wholly deprived of air. While vegetable aliment was supposed to enter by means of what is termed capillary attraction, pores as well as tubes seemed to be absolutely necessary. But the recent experiments of M. Dutrochet have shown that the intervention of visible pores is not at all necessary, whether to the imbibition of moisture or to the inhalation of gases. The gas or the liquid enters by virtue of what he calls *endosmose*, that is, a rush inwards of a less dense fluid to a more dense fluid, excited by electricity. His experiments and hypothesis will be specified and examined under the article of the "ASCENT OF THE SAP." In the meantime we shall content ourselves with merely saying that we do by no means regard his conclusions as following legitimately from his premises; nor can we regard any cause accounting for the effect in question as being at all adequate to its object, which does not involve the agency of a power of a higher order than that either of capillary attraction or of electricity, namely, the agency of the living energies of the plant. [I. K.]

It is important to attend particularly to the distinction pointed out above, that it is not the whole of the root which is endowed with the power of absorbing nourishment, but only the points of the root fibres, termed spongelets. The surface of the root, whose outer bark has acquired a certain consistence, does not absorb the moisture of the soil in contact with it; but the roots, and also the smallest rootlets, constantly lengthen at their extremities; and these extremities are composed of a fine cellular tissue, compact, spongy, and the whole newly developed, possessing in a high degree the hygroscopical faculty proper to vegetable tissue.

M. Carradori (*Degli Organi Assorbenti*) has remarked, that there is a slight absorption, either by the surface of the roots, or by the fugacious hairs with which the roots of young plants are often furnished; but this effect seems owing to general hygroscopicity; and he himself agrees that this absorption is extremely feeble, especially in old and woody roots, comparatively with that which takes place at their extremities. These experiments, however, are not made with such minute accuracy as to enable us to appreciate this comparison.

When we cut a branch of a tree and plunge it into water, its woody tissue thus laid bare quickly absorbs a quantity of water; and in this manner is the life of branches preserved which are kept for ornamental purposes, but this effect has a limit. The extremity which has been cut and plunged in the water is not renewed as in the case of the root; and is, consequently, more or less quickly altered or deteriorated by being in contact with the water. We renew its action by cutting off the rotting extremity, and thus place a new and healthy surface in contact with the liquid. The water which in this manner penetrates into the woody tissue of vegetables, preserves

their existence, at least for a certain time, as if it entered by the spongelets. This is the same thing, we may rest assured, in these phenomena, as is presented in the development of the cuttings of trees, which are also nourished in general only through the water sucked up by the surface of their denuded wood. These means of nutrition are, however, accidental or artificial; and absorption is a natural operation by the spongelets in general, or by the suckers in some vegetable parasites. M. Sennebier observed, that if we divide a plant into three parts, the roots as far as the crown, the stem as far as the branches, and the leafy top, then plunge the lower ends of these into water, the whole three will pump up a certain quantity, but the leafy parts more than the others. This absorption particularly takes place at the cut surface, where the woody parts are laid bare.

A branch of raspberry put in water and exposed to the sun has sucked up a hundred and fifty grains, but only imbibed eight grains when the division has been covered over with wax. It sucked up as much when, having the divided part covered, it was plunged in the whole of its length, as only a short zone at the extremity was immersed. This proves that the outer bark is impenetrable to water.

The woody portion when laid bare sucks up moisture in every way; that is to say, when we cut a branch and place it in the water, it sucks it up, either when put into it by the upper or by the lower cut part. The habitual or upright direction, however, appears to offer certain facilities for this more than an inverse one. This, indeed, results, first, from the observation of M. Pollini (*Elem. di Botan.*, i. 281); for the watery juices mount a little less high in the branches placed in an inverse direction; secondly, from the observation of common gardeners, and of Mr. T. A. Knight, that in the cuttings made in an inverse manner, it is more frequently only the lower buds which are developed, and not the higher ones, as happens in those made in a direct manner. It is necessary, in order to render these experiments comparative, that the horizontal cuttings be made equal; and as we were doubtful whether this circumstance had been taken into consideration, we made the following experiment:—We placed two branches of willow in water, the one in a direct manner, the other inverted, and contrived in such a manner that these two absorbing bodies were equal; but the branch which was placed inverted pushed its roots a little slower than the direct one.—(*Mém. sur les Lenticelles, Ann. des Sc. Nat.*, 1825, *Jan.*, pp. 18, 19).

The wood tends not only to absorb the water by its transverse section, but also lengthways. Thus we placed in water (*ibid.* p. 4) a branch of willow, the section of which was covered with mastic, but which had the part immersed denuded of the bark by taking off a cortical ring of an inch in length. This branch pushed its buds and roots in a manner similar to the branches, which are immersed by a transverse section.

The hygrometrical power of wood is such, that when we expose it to the air it easily imbibes the surrounding moisture; and, when preserved in shady places, it never dries of itself. Count Rumford (*Mém. sur le Bois et le Charbon*, 8vo. Paris, 1812) dried in an oven a piece of wood taken from the interior of a beam which had been placed for one hundred and fifty years in a battlement, and observed that it lost about ten per cent. of its own weight; and he thinks that this is the greatest degree of natural desiccation which wood can attain in our climate. An oak faggot, exposed eighteen months in the air, and which might be regarded as excellent wood for burning, lost twenty-four per cent. The same experimenter observed, that when chips of wood have been well dried in a stove, on their exposure to the open air they very freely imbibe water. If these chips are placed for twenty-four hours in a room, the extremes of this power of absorption have proved to be, on one side, the Lombardy poplar, whose chips, five inches long by six lines broad, have sucked up 0·87 grains; and, on the other, a billet of oak of the same dimensions, which sucked up 1·40 grains. When the same chips were exposed for eight successive days, it was found that they did not increase in weight, if the air had remained at the same temperature, but they lost in weight if the air became more heated. This experiment, then, proves that the absorption is rapid; and that the equilibrium it attains will be determined by the surrounding atmosphere, and certainly also by its own hygrometrical power.

As in animals, the powers which determine the entrance of aliment into the mouth are very different from those which conduct it from the mouth to the stomach; so in plants, we ought to distinguish with accuracy the power of absorption which resides in the spongelets, from that which determines the ascent of the sap in the stems. At least, if these two classes of facts arise from the same cause, it is necessary that they be distinguished in the investigation. The force of absorption of the spongelets may be observed as a result of their vital action, combined with their capillarity, and especially with the hygroscopical force with which the vegetable tissue is generally endowed.

We have, according to the opinion adopted by Sennebier, ascribed this effect to hygroscopicity alone; but, having examined those phenomena which take place in spring, we are led to admit the direct action of the vital contractility in the spongelets.—(*Princ. Elém. de Bot.*; *Flore Franç.*, i. 166).

As vegetables are destitute of will, or any kind of motion, and by consequence without any organ of apprehension, properly speaking, they cannot seek the aliment which agrees with them, it was necessary, for their proper support, that there should be a force acting and inherent in their tissue given to them to absorb their food whenever it should come in contact with them; and that their food should be spread abundantly over all nature, and should also be of a quality so easy to be absorbed, as to offer no resistance to their feeble action.

These necessary conditions of existence have been effected by the organisation of the spongelets as organs of suction, and by the nature of the water, which is abundantly diffused over nature, and also well impregnated with their principal nourishment.

The nature of the action of the spongelets is remarkable in this, that the choice which they seem to make of the matter which they absorb does not appear to be determined by the natural wants of the plant, but the facility is less or more influenced by the nature of the liquids. Thus M. Theodore de Saussure (*Rech. Chim.*, ch. 8) found, that if we place plants in water, with which are mixed sugar, gum, or the like, the spongelets will absorb a

greater proportion of water than of the materials which are dissolved in it; for the water which remained after the experiment was more saturated than before the roots were put into it. Again, if we plunge the roots into different solutions, they will absorb so much the more of these in proportion to their fluidity, although at the same time such solutions may be injurious to the plant, and yet will they absorb a less proportion of viscous matter, although this may contain more nutritive materials. Thus, of blue vitriol (*sulphate of copper*), the most hurtful of the substances employed, they absorbed a large quantity, but a very small quantity of the gum, which is not injurious. When we placed plants in solutions of gum, of different degrees of thickness, we found that the quantity absorbed was smaller in proportion as the solution was more viscous. Sir H. Davy, also, observed, that plants perished in those solutions in which there was a large quantity of sugar or gum; and prospered when the solutions had only a small quantity of either.—(*Agricult. Chem.*)

The effect of the viscosity is obviated when we put the roots in water which holds pulverulent particles in suspension. Thus, the drainings of dunghills, which contain carbonic particles, and likewise coloured waters, are taken up by the roots in smaller quantities than pure water; and proportionally less the more the water is loaded with foreign particles. It should seem that these particles have a tendency to obstruct the imperceptible pores, passages, or cells of the spongelets. M. Th. de Saussure remarks, that analogous laws may be observed in the case of liquids in which different substances are dissolved, the more fluid being absorbed in a greater quantity than others. It would accordingly appear that the roots exercise a kind of choice in the soil, but that the choice, far from being relative to the wants of the plants, is a circumstance purely mechanical. The choice must therefore be considered more as a function of the tissue than as a vital function.

On the other hand, M. Pollini, who has repeated these experiments, found that of the solutions of different substances in water, the roots sucked up different quantities without any apparent regard to their viscosity. Thus he constantly found, he says, that the roots absorbed more of common salt, or of potass, than of the acetate or of the nitrate of lime, and more of sugar than of gum. He found, on the other hand, that if he cut the extremity of a root, the water which entered by the wound contained indifferently all the salts which had been dissolved in the water; and the portion which remained after absorption did not contain more than before.—(*Saggio di Osserv. e di Speranze sula Veget. degli Alberi, Verona*, 1815.)

These facts, though somewhat contrary to the preceding, are less carefully detailed, and appear to lead to the idea of there being a vital action in the spongelets.

Another circumstance remarkable in the experiments which we have before detailed is, that the disorganised tissue of the spongelets appears to give a much freer passage to the juices than that which has been uninjured. Thus plants can only live for two or three days in a solution of blue vitriol (*sulphate of copper*), of which they absorb a large quantity; while they will live eight or ten days in a solution of gum, of which they absorb only a very little.

Branches cut and plunged in the different solutions follow similar laws, and absorb both water and the substances dissolved in the same.

According, also, to experiments which we shall elsewhere repeat more fully, branches absorb all the poisons which are presented to them, as well as substances which are more proper for their nourishment.

It is very probable that the spongelets of different species of plants are not all organised in a uniform manner, and that there are some which more easily admit of certain substances; but microscopical observations are still far from accounting for these differences, and the facts drawn from culture are equally obscure in directing our judgment upon the point.

The manner in which plants of different kinds exhaust the soil relative to each other, the general action of manures, the prodigious number of different plants which we can cultivate in the same patch of a garden, tend to prove that the differences of absorption in vegetables are not of great importance. Instead of the variety of aliments which sustain the life of animals, we find among vegetables a great uniformity of the absorbent organs, as well as of the substances absorbed.

The facts relative to the quantity of liquid absorbed at different epochs of the life of plants, and under the influence of different atmospherical circumstances, appear more intimately connected with the ascent of the sap than with its suction.

The spongelets of the roots being essentially composed of a cellular tissue, the cells are either rounded or oval; and it is very probable that the water is filtered through the intercellular passages or ducts, either by an effect of hygroscopicity and of capillarity, which are still found a little after the roots are dead, or probably by the contractions and alternate dilatations of the cells, which are the vital portion of the phenomenon, and determine the quantity of the absorption of living plants, so considerable when compared with that of dead plants. [F. D.]

Absorption varies according to the state of the plants and the periods of their growth, going on more rapidly in proportion as the leafing is rapid. At the time of flowering and fruiting, also, more nourishment is absorbed from the soil. We likewise know that absorption, as well as the progression of the fluids absorbed, depends greatly on the influence of heat and light; that it is most active in spring, that it diminishes in autumn, and is reduced almost to nothing, if it do not altogether cease, in winter. [J. T.]

ABSUS (from the Greek, *'αβσος*). The Egyptian lotus. [A. C.]

ABUTILON, Tourneforte (from the Greek, *αβυτιλον*, "mulberry tree," on account of the resemblance of the leaves). Mulberry-leaf. *Monadelphia Polyandria*, Linnæus; *Malvaceæ*, Jussieu. A genus separated from *Sida*. Calyx naked, five-cleft, generally angular; pistil many-cut at the summit; fruit capsular, usually bladdery, five to thirty in a whirl around the central axis, one-celled, three or many-seeded, connected so closely together as to form a many-celled capsule, awned at the tip.

I.

CAPSULES FROM FIVE TO EIGHT.

1. *Trees.*

1. Taller Mulberry-leaf (*A. excelsior*, Cavanilles). A stove tree, about fourteen feet high, from Peru: leaves heart-shaped, egg-oblong, taper-pointed, entire, yellowish and cottony beneath; flowers yellow in panicled clusters; capsules five to three-seeded. *Sida excelsior*, Cav. Diss. I. p. 27, T. 5, f. 3.—D. C. Sp. 110.

2. *Shrubs.*

2. Large-eared Mulberry-leaf (*A. auritum*, Wallich). A stove shrub, four feet high, from Bengal in 1823: leaves deeply heart-shaped, with a narrow recess, taper-pointed, rather toothed, hairy above, hoary beneath; flowers, in May and June, yellow, in panicles; leaf-scales (*stipulæ*) broad, heart-shaped, eared, and taper-pointed; capsules five, hairy; propagated by cuttings in common garden earth. *Sida aurita*, Link.—D. C. Sp. 117.

3. Horned Mulberry-leaf (*A. cornutum*, Willdenow). A stove shrub, ten feet high, from South America. leaves egg-oblong, heart-shaped, toothed, covered with soft down; flowers, yellow, in panicles; capsules five to six, inflated, horned, three-seeded.

4. Elegant Mulberry-leaf (*A. elegans*, St. Hilaire). A stove shrub, three feet high, from Brazil: leaves heart-shaped, oblong, taper-pointed, unequally-toothed, velvety and hoary beneath; flowers red (?), on foot-stalks which are axillary, in pairs, and hairy; capsules eight, four to nine-seeded.—St. Hil. Fl. Bras., I. p. 217.

5. Rusty Mulberry-leaf (*A. ferrugineum*, Humboldt). A stove shrub, three feet high, from Peru in 1822: leaves egg-oblong, somewhat heart-shaped, taper-pointed, cottony, entire; flowers, in July and August, yellow, on single foot-stalks, which are one-flowered and shorter than the leaves; capsules five, beaked, three-seeded; propagated by seed in common garden earth. *Sida ferruginea*, Kunth, Nov. Gen. Amer. 5, p. 271.—D. C. Sp. 109.

6. Ground-Ivy Mulberry-leaf (*A. glechomæfolium*, St. Hilaire). A stove shrub, four feet high, from Brazil: leaves heart-shaped at the base, nicked; flowers, in November and January, pinkish, solitary and axillary; stems prostrate, and as well as the leaves, covered with spreading down; capsules three to five, three-seeded.—St. Hil. Fl. Bras., I. p. 198, T. 411.

7. Hernandian Mulberry-leaf (*A. Hernandioides*, L'Heritier). A stove shrub, four feet high, from Hispaniola in 1798: leaves rather target-egg-oblong, heart-shaped, taper-pointed, almost entire, downy; flowers, yellow, on foot-stalks which are one-flowered and shorter than the leaf-stalks; capsules awnless; propagated by cuttings in common garden earth. *Sida Hernandioides*, L'Heritier, Stirp. V., p. 121, T. 58.—D. C. Sp. 111.

8. Unequal-sided Mulberry-leaf (*A. inæquilaterum*, St. Hilaire). A stove shrub, two feet high, from Brazil: leaves egg-oblong, heart-shaped at the base, unequal-sided, fringe-saw-toothed; flowers, in February, golden-yellow, on single, one-flowered, axillary flower-stalks; capsules eight, three-seeded.—St. Hil. Fl. Bras., I. p. 198, T. 40.

9. Lechenault's Mulberry-leaf (*A. Lechenaultianum*, De Candolle). A stove shrub, three feet high, from the East Indies in 1820: leaves heart-shaped, roundish, taper-pointed, entire, velvety above, hoary beneath; flowers, in July and August, yellow, on many-flowered foot-stalks, axillary, and of the length of the leaf-stalks; petals inversely heart-shaped; capsules five; propagated by seed in common garden earth. *Sida Lechenaultiana*, De Candolle.—D. C. Sp. 114.

10. White-flowered Mulberry-leaf (*A. leucanthemum*, St. Hilaire). A stove shrub, two feet high, from Rio Janeiro: stem angular, downy; leaves heart-shaped, taper-pointed, entire, downy; flowers, in August, white, in few-flowered clusters; capsule covered with spreading down, five-beaked, three-celled.—St. Hil. Fl. Bras., I. p. 200.

11. Woody-fruited Mulberry-leaf (*A. lignosum*, Cavanilles). A stove shrub, three feet high, from St. Domingo: leaves heart-shaped, roundish, taper-pointed, nicked, cottony; flowers, yellow, on solitary foot-stalks, which are longer than the leaf-stalks; capsules seven to eight, awnless, three-seeded, very hard.—Cav. Diss. I. p. 28, T. 6, f. 2.

12. St. Lucia Mulberry-leaf (*A. Lucianum*, De Candolle). A stove shrub, two feet high, from the island of St. Lucia in 1820: leaves heart-shaped, egg-oblong, roundish, taper-pointed, almost entire, inclined to be velvety above and hoary beneath; flowers, in July and August, white, on flower-stalks which are much branched, very short, and panicled; capsules five; propagated by seed in common garden earth. *Sida Luciana*, De Candolle.—D. C. Sp. 112.

13. Naked-flowered Mulberry-leaf (*A. nudiflora*, L'Heritier). An elegant stove shrub, four feet high, from St. Domingo in 1731: leaves heart-shaped, roundish, taper-pointed, almost entire, cottony beneath; flowers, in May and June, large, yellow, in clustered and terminal panicles; capsules five to seven, three-seeded; propagated by cuttings in common garden earth. *Sida nudiflora*, L'Her. Stirp. I. p. 123, T. 59, bis. D. C. Sp. 116.

14. Small-flowered Mulberry-leaf (*A. parviflorum*, St. Hilaire). A stove shrub, one to two feet high, a native of Brazil: leaves heart-shaped, taper-pointed, entire, smooth above, heary beneath; flowers, in April, white and yellow, in panicles, which are few-flowered; capsule covered with spreading down, five-beaked, three-seeded; propagated by seed in common garden earth.—St. Hil. Fl. Bras., I. p. 201.

15. Spreading Mulberry-leaf (*A. patens*, St. Hilaire). A stove shrub, three feet high, from Rio Janeiro: leaves heart-shaped at the base, egg-oblong, lance-shaped, entire, smooth above, hoary beneath; flowers, golden-yellow, in many-flowered panicles; capsule smoothish, five-beaked, three-seeded.—St. Hil. Fl. Bras., I. p. 200.

16. Neat Mulberry-leaf (*A. pulchellum*, Bonpland). A stove shrub, two feet high, from New Holland in 1824: leaves heart-egg-oblong, lance-shaped, coarsely and unequally nicked, rough above, starry and downy beneath; flowers, in July and August, white, in clusters which are axillary, few-flowered, and longer than the leaf-stalks; capsules five, two to three seeded; propagated by seed in common garden earth. *Sida pulchella*, Bonpl. Nar. T. 2.—D. C. Sp. 121.

17. Branch-flowered Mulberry-leaf (*A. ramiflorum*, St. Hilaire). A stove shrub, five feet high, from Brazil: stem deeply furrowed; leaves heart-shaped, taper-pointed, nearly entire, velvety, cottony; flowers, yellow, in panicles; capsules five to six, clammy, covered with stiff hairs, three-seeded.—St. Hil. Fl. Bras., I. p. 199.

18. Branched Mulberry-leaf (*A. ramosum*, Cavanilles). A stove shrub, three feet high, from Senegal: leaves egg-oblong, heart-shaped, unequally and deeply toothed; flowers, in July, yellow, on flower-stalks from four to six-flowered; capsules five to six, three-seeded. *Sida Africana*, Palisot de Beauvais.—Cav. Diss. I. p. 28, T. 6, f. 1. D. C. Sp. 124.

19. Sunda Mulberry-leaf (*A. Sundaicum*, Blume). A stove shrub, eighteen inches high, from Java: leaves deeply heart-shaped, roundish, taper-pointed, roughly toothed, velvety above, hoary beneath; flowers, yellow, in clustered panicles; capsules five, awnless. *Sida Sundensis*, Sprengel.

20. Timor Mulberry-leaf (*A. Timoriense*, De Candolle). A stove shrub, three feet high, from the island of Timor: leaves heart-shaped, roundish, taper-pointed, somewhat nicked, white-velvety; flowers, yellow, in loose terminal panicles; capsules five to six, oblong, covered with stiff hairs.

21. Triangular Mulberry-leaf (*A. triquetrum*, Linnæus). A stove shrub, three feet high, from South America in 1775:

leaves heart-shaped, taper-pointed, slightly saw-toothed, white-velvety; flowers in July and August, yellow, with a purple bottom, on single one-flowered foot-stalks; capsules five, awnless, three-seeded; branches three-angled; propagated by cuttings in common earth. *Sida triquetra*, Linnæus. —D. C. Sp. 119.

3. *Herbs.*

22. Periplocan Mulberry-leaf (*A. periplocifolium*, Linnæus). A stove annual, three feet high, from India in 1691: leaves heart-spear-shaped, taper-pointed, entire; flowers, in July and August, pale yellow, sometimes light purple; foot-stalks panicled, very slender, longer than the leaf-stalks, jointed under the flower; capsules five, egg-oblong, three-seeded; propagated by seed in common garden earth. *Sida periplocifolia*, Linnæus.—D. C. Sp. 108.

Var. a. Ceylon Mulberry-leaf (*A. Zeylanicum*, De Candolle). A native of Ceylon: leaves narrow, and rather rough beneath.—Pluk. T. 74, f. 7.

Var. b. Caribbean Mulberry-leaf (*A. Caribæum*, De Candolle). A native of Jamaica: leaves heart-shaped, rather rough above.—Sloan. I., T. 139, f. 2.

Var. c. Peruvian Mulberry-leaf (*A. Peruvianum*, De Candolle). A native of Peru: leaves heart-shaped, whitish-velvety above; foot-stalks simple, and shorter than the leaves. De Candolle imagines it to be a distinct species.

II.

CAPSULES LESS OR MORE THAN EIGHT.

23. Gigantic Mulberry-leaf (*A. giganteum*, Jacquin). A stove shrub, five to ten feet high, from the Caraccas in 1820: leaves heart-shaped, roundish, nicked, having three points, white and velvety; flowers, in July and August, yellow, in clusters; corolla bent backwards; capsules five to many-seeded, varying, according to Jacquin, from eight to eleven; propagated by seed in common garden earth. *Sida gigantea*, D. C. Sp. 126.—Schœnb. II., p. 8, T. 141.

24. Soft Mulberry-leaf (*A. molle*, Ortega). A stove shrub, eight to twenty feet high, from Peru in 1816: leaves heart-shaped, roundish, taper-pointed, unequally nicked, toothed, covered with soft down; flowers, in November and December, rather large, yellow, on stalks which are one or two-flowered, and shorter than the leaf-stalks; capsules eight to ten, three-seeded, rather longer than the calyx; branches very hairy; propagated by seed in common garden earth. *Sida grandifolia*, Willdenow.—Bot. Mag. 2759.

25. Blunt Mulberry-leaf (*A. obtusum*, Cavanilles). A stove shrub, three feet high, native country unknown: leaves egg-oblong, heart-shaped, blunt, toothed, and having three points; flowers pale yellow, on flower-stalks, generally four-flowered, umbelled, and longer than the leaf-stalks; capsules eight to ten, acute, three-seeded. *Sida obtusa*, D. C. Sp. 123.—Cav. Diss. I., p. 34, T. 9, f. 2.

26. Twiggy Mulberry-leaf (*A. virgatum*, Cavanilles). A stove shrub, three feet high, from Peru in 1818: leaves egg-oblong, heart-shaped, taper-pointed, toothed, covered with spreading down; flowers, in July and August, yellow, on solitary foot-stalks, which are longer than the leaf-stalks; petals not so long as the calyx; capsules seven to nine, two-awned, and three-seeded; propagated by seed in common garden earth.—Cav. Icon., I. p. 53, T. 73. D. C. Sp. 133.

27. Umbelled Mulberry-leaf (*A. umbellatum*, Linnæus): A stove annual, eighteen inches high, from Jamaica in 1788. leaves heart-shaped, roundish, taper-pointed, toothed; flowers, in July and August, yellow, on flower-stalks, axillary, umbelled; capsules six to eleven; propagated by seed in common garden earth. *Sida umbellata*, D. C.; Sp. 125.

III.

CAPSULES LESS THAN NINE, BUT THE NUMBER NOT KNOWN.

28. Hoary Mulberry-leaf (*A. incanum*, Link). A stove shrub, three feet high, from the Sandwich Islands in 1818: leaves heart-shaped, rather taper-pointed, sharply nicked, and hoary with cotton; flowers, in July and August, yellow, on single, one-flowered foot-stalks, which are longer than the leaf-stalks; calyx and capsule hoary; propagated by cuttings in common garden earth. *Sida incana*, D. C. Sp. 120.

29. Many-flowered Mulberry-leaf (*A. polyanthum*, Schlecht). A stove shrub, three feet high, introduced in 1821, but the native country unknown: leaves heart-shaped, short-pointed, rather nicked, downy and green; flowers, in May and June, small, deep yellow; propagated by cuttings in common garden earth. *Abutilon polyandrum*, G. Don; *Sida polyantha*, D. C. Sp. 116.

30. Spike-flowered Mulberry-leaf (*A. spicatum*, Humboldt). A stove shrub, two feet high, from Guiana: leaves heart-shaped, roundish, much pointed, rather nicked, hoary beneath; flowers in slender terminal spikes; capsules three-seeded. *Sida spiciflora*, D. C. Sp. 113.

IV.

CAPSULES NINE OR MORE.

1. *Trees.*

31. Tree Mulberry-leaf (*A. arboreum*, Linnæus, Jun.) A stove tree, twelve feet high, from Peru in 1772: leaves heart-shaped, roundish, taper-pointed, nicked, cottony; flowers, in July and August, large, whitish yellow, on foot-stalks longer than the leaves; leaf-scales fringed; capsules thirteen to fifteen, five seeded; propagated by cuttings in common garden earth. *Sida Peruviana*, Cavanilles; *Sida grandifolia*, Poiret.—Linn. jun. Suppl. 397. D. C. Sp. 134.

2. *Shrubs.*

32. Maple Mulberry-leaf (*A. acerifolium*, Lagasca). An evergreen, greenhouse shrub, four feet high, from New Spain in 1820: leaves heart-shaped, three to five lobed, unequally toothed, velvety; capsules ten to twelve, bulged, each two-awned at the base; propagated by cuttings in common garden earth. *Sida spinifex*, and probably *Sida palmata*, of Cavanilles.—D. C. Sp. 164.

33. Whitish Mulberry-leaf (*A. albidum*, Willdenow). An evergreen, greenhouse shrub, three feet high, from the Canary Islands in 1822: leaves heart-shaped, taper-pointed, toothed, hoary from soft cotton; flowers, in July and August, whitish yellow, on foot-stalks the length of the leaf-stalks; capsules twelve to fifteen, abrupt, many-seeded; propagated by cuttings in common garden earth.

34. Dark purple Mulberry-leaf (*A. atropurpureum*, Blume). A stove shrub, three feet high, from Java: leaves heart-shaped, roundish, taper-pointed, unequally nicked, downy above from simple and starred hairs, cottony beneath; flowers dark purple, in terminal panicles, on foot-stalks much shorter than the leaf-stalks; capsules about ten.—Blume.

35. Flesh-flowered Mulberry-leaf (*A. carneum*, St. Hilaire). A stove shrub, about two feet high, from Rio Janeiro: leaves heart-shaped, taper-pointed, toothed, covered with spreading down above, and white cotton beneath; flowers, in September, pale red, solitary and terminal; capsule ten-horned, four to nine-seeded.—St. Hil. Fl. Bras. I. p. 205.

36. Rock-rose Mulberry-leaf (*A. cistiflorum*, Blume). A shrub. one to two feet high: leaves egg-oblong, heart-

shaped, taper-pointed, nicked, toothed, and covered with white cotton; flowers yellow (?), on an axillary, solitary, one-flowered stalk, twice the length of the leaf-stalks; capsules ten to thirteen, blunt, velvety.—Blume.

37. Thick Mulberry-leaf (*A. crassifolium*, L'Heritier). A stove shrub, two feet high, from Hispaniola: leaves egg-oblong, heart-shaped, rather three-toothed, hoary; flowers yellow, on foot-stalks the length of the leaf-stalks; capsules nine to ten, two pointed, two-seeded. *Sida tricuspidata*, Cavanilles.—L'Her. Stirp. I., p. 125, T. 60. *Sida crassifolia*, D. C. Sp. 161.

Var. a. Cottony Mulberry-leaf (*A. tomentosum*). A native of America, having its branches three or four-sided.—Cav. Discr., 104.

38. Bourbon Mulberry-leaf (*A. exstipulare*, Cavanilles). A stove shrub, two feet high, from the Island of Bourbon: leaves egg-oblong, heart-shaped, taper-pointed, cottony, without leaf-scales (*stipulæ*); flowers yellow, on solitary foot-stalks shorter than the leaf-stalks; capsules thirty, awnless, one to three-seeded.—Cav. Diss. II., p. 56, T. 14, f. 2.

39. Sea-green Mulberry-leaf (*A. glaucum*, Cavanilles). An evergreen stove shrub, three feet high, from Senegal in 1824: leaves roundish, heart-shaped, taper-pointed, coarsely-toothed, and covered with hoary grey cotton; flowers, in July and August, yellow, on foot-stalks, upper ones longer, lower ones shorter, than the leaf-stalk; capsules twelve to fifteen, blunt, beset with seven glandular hairs, one to three-seeded; propagated by seed in common garden earth. *Sida glauca*, D. C. Sp. 159. Cav. Icon., p. 8, T. 11.

40. Globe Mulberry-leaf (*A. globiflorum*, Hooker). A stove shrub, five feet high, from the Mauritius in 1825: leaves on long stalks, heart-shaped, toothed, tapering much at the tip; flowers, in November, large, cream-coloured, globose, on stalks as long as the leaf-stalks; capsules ten; propagated by seed or by cuttings in common garden earth. *Sida globiflora*, Bot. Mag., 2821.

41. Beardless Mulberry-leaf (*A. imberbe*, De Candolle). A stove shrub, two feet high, from Guadaloupe and St. Domingo: leaves heart-shaped, acute, nicked, white and velvety, upper leaves nearly without foot-stalks; flowers yellow, on solitary foot-stalks, three times longer than the leaf-stalks; capsules twelve to thirteen.

42. Mauritian Mulberry-leaf (*A. Mauritianum*, Jacquin). A stove shrub, three feet high, from Mauritius in 1789: leaves heart-shaped, roundish, taper-pointed, toothed, cottony beneath; flowers, from July till September, orange-coloured, on foot-stalks longer than the leaf-stalks; capsules thirty; three-seeded; propagated by seed in common garden earth. *Sida planiflora*, Cavanilles.—Jac. Icon. Rar. I. T. 137. *Sida Mauritiana*, D. C. Sp. 135.

43. Small-flowered Mulberry-leaf (*A. micranthum*, St. Hilaire). A stove shrub, two to six feet high, from Brazil: leaves heart-shaped, taper-pointed, toothed, cottony beneath; flowers large, in clusters; capsules twelve, four to nine-seeded.—St. Hil. Fl. Bras. I. p. 208.

44. Small-seeded Mulberry-leaf (*A. microspermum*, Cavanilles). A stove shrub, two feet high, native country unknown: leaves roundish, heart-shaped, acute, rather nicked; flowers yellow, on solitary foot-stalks, shorter than the leaf-stalks; capsules twelve to thirteen, two to three-seeded, each ending in two fringed beaks; seed very small.—Cav. Diss. I., p. 29, T. 13, f. 4.

45. Soft-haired Mulberry-leaf (*A. mollicomum*, Willdenow. An evergreen stove shrub, four feet high, introduced in 1816, native country unknown: leaves egg-oblong, heart-shaped, unequally toothed, three-toothed, soft, cottony; flowers, in July and August, yellow, on foot-stalks shorter than the leaf-stalks; capsules nine, bulged, two-seeded; propagated by seed in common garden earth. *Sida coricea*, Cavanilles.—D. C. Sp. 162.

46. Very soft Mulberry-leaf (*A. mollissimum*, Cavanilles). A stove shrub, four to five feet high, from Peru in 1789: leaves large, roundish, heart-shaped, taper-pointed, toothed, velvety; flowers, in June and July, primrose yellow, on foot-stalks, commonly two-flowered, shorter than the leaf-stalks; capsules eleven, three-seeded, of the same length as the ten-angled calyx; propagated by seed in common garden earth. *Sida cistiflora*, L'Heritier; *Sida mollissima*, D. C. Sp. 149.—Cav. Diss. II., p. 49, T. 14, f. 1.

47. Mountain Mulberry-leaf (*A. montanum*, St. Hilaire). A stove shrub, four feet high, from Rio Janeiro: leaves heart-shaped, taper-pointed, toothed, covered with spreading down above, cottony and pale beneath; flowers purple, axillary, solitary or in pairs; capsules ten, from four to nine-seeded.—St. Hil. Fl. Bras. I. p. 207.

48. Round Mulberry-leaf (*A. orbiculatum*, De Candolle). An evergreen, greenhouse shrub, three feet high, from China in 1820: leaves egg-oblong, round, rather kidney-shaped, toothed; flowers, in June and July, yellow, on foot-stalks longer than the leaf-stalks; capsules thirteen, two-toothed; propagated by cuttings in common garden earth.

49. Few-flowered Mulberry-leaf (*A. pauciflorum*, St. Hilaire). A stove shrub, four feet high, from Brazil: leaves roundish, heart-shaped, taper-pointed, unequally toothed, velvety; flowers red, axillary, solitary; capsule velvety twelve to thirteen horned, four to nine-seeded.

50. Long-stalked Mulberry-leaf (*A. pedunculare*, Humboldt). A stove shrub, four feet high, from South America: leaves roundish, egg-oblong, deeply heart-shaped, taper-pointed, toothed, hairy above, hoary beneath; flowers purple, on solitary, very long foot-stalks; petals bent backwards; capsules twenty, three or four-seeded.

51. Softest Mulberry-leaf (*A. permolle*, Willdenow). A stove evergreen shrub, four to eight feet high, from South America in 1817: leaves roundish, heart-shaped, taper-pointed, unequalled nicked, cottony; flowers, in July and August, yellow, on axillary solitary flower-stalks, upper ones somewhat clustered; capsules nine to ten, beaked, three-seeded; propapated by seed in common garden earth. *Sida permollis*, D. C. Sp. 153.

52. Petiolar Mulberry-leaf (*A. petiolare*, Humboldt). A stove shrub, four feet high, from New Granada: leaves on long foot-stalks, roundish, deeply heart-shaped, taper-pointed, doubly-toothed, soft, downy above, white cottony beneath; flowers white, on axillary foot-stalks, one flowered; capsules eleven, three to four-seeded.

53. Downy Mulberry-leaf (*A. pubescens*, Cavanilles). A stove shrub, three feet high, from St. Domingo: downy; leaves roundish, heart-shaped, taper-pointed, angularly nicked, cottony; flowers whitish, on foot-stalks longer than the leaf-stalks; capsules fifteen, abrupt, two-toothed, three-seeded.—Cav. Diss. I., p. 33, T. 7, f. 6.

54. Fair Mulberry-leaf (*A. pulchrum*, Colladon). An ornamental stove shrub, one to two feet high, from the island of St. Martha in 1826: leaves roundish, heart-shaped, unequally toothed, rather three-lobed at the tip; flowers, in July and August, very elegant, yellow, with a dark centre, on solitary one-flowered foot-stalks; capsules ten to thirteen, awnless, three-seeded; propagated by seed in common garden earth. *Sida pulchra*, Coll. Hort. Rip., p. 129. T. 34.

55. Reflex Mulberry-leaf (*A. reflexum*, Cavanilles). A stove shrub, four feet high, from Peru in 1799: leaves roundish, heart-shaped, taper-pointed, nicked, and cottony; flowers, in July and August, large, scarlet, on single foot-stalks, longer than the leaf-stalks; petals wedge-shaped, bent backwards; capsules twelve, three-seeded; propagated by cuttings in common garden earth. *Sida retrorsa*, L'Heritier. Cav. Diss. I., p. 36, T. 7 and 6, T. 195, f. 1. D. C. Sp. 127.

56. River-bank Mulberry-leaf (*A. rivulare*, St. Hilaire). A stove shrub, three feet high, a native of Brazil: leaves heart-shaped, oblong, blunt, toothed, cottony; flowers red, in umbels; capsules ten to twelve, three-seeded.

57. Rusty Mulberry-leaf (*A. rufescens*, St. Hilaire). A stove shrub, three feet high, from Brazil: rusty; leaves egg-oblong, lance-shaped, blunt at the base, taper-pointed at the tip, toothed, smooth above, cottony beneath; flowers yellow, in bundles; capsules thirteen to sixteen, four to nine-seeded.—St. Hil. Fl. Bras. I., p. 205, T. 42.

Var. a. Crowded Mulberry-leaf (*A. confertum*, St. Hilaire): leaves lance-shaped, somewhat line-like, and crowded.

58. Terminal Mulberry-leaf (*A. terminale*, Cavanilles). A stove shrub, three feet high, from Monte Video: leaves egg-oblong, heart-shaped, deeply nicked, cottony; flowers yellowish and rose-coloured on the exterior; clusters terminal, and furnished with flower-scales (*bracteæ*); capsules ten to twelve, awnless, three-seeded.—Cav. Diss. I., p. 29, T. 6, f. 6, et T. 195, f. 2.

59. Umbelliferous Mulberry-leaf (*A. umbelliferum*, St. Hilaire). A stove shrub, seven feet high, from Brazil: leaves heart-shaped at the base, abruptly taper-pointed, velvety above, and hoary beneath; flowers purplish, in umbels, on the tops of long flower-stalks; capsules twelve to thirteen, three-seeded, with an equal number of beaks.

60. Bladdery Mulberry-leaf (*A. vesicarium*, Cavanilles). An evergreen stove shrub, three feet high, from Mexico in 1822: leaves egg-oblong, heart-shaped, toothed, rather three-toothed, white beneath; flowers, in July and August, yellow, on foot-stalks twice the length of the leaf-stalks; capsules ten, awnless, five-seeded; propagated by cuttings in common garden earth. *Sida vesicaria*, Cav. Diss. II., p. 55, T. 14, f. 3.—D. C. Sp. 158.

61. Vine Mulberry-leaf (*A. vitifolium*, Cavanilles). A greenhouse shrub, six feet high, from Chili: leaves heart-shaped, five to seven-lobed; lobes taper-pointed, toothed, cottony beneath; flowers large, rose-coloured, on foot-stalks longer than the leaf-stalks, branched and umbelled; capsules nine, each two-awned at the tip, and six-seeded.—Cav. Icon. T. 428. *Sida vitifolia*, D. C. Sp. 163.

3. *Herbs.*

62. American Mulberry-leaf (*A. Americanum*, Linnæus). A stove annual, six feet high, from Jamaica in 1733: leaves heart-shaped, oblong, undivided, cottony; flowers, in July and August, large, yellow, on foot-stalks shorter than the leaves; capsules twelve; propagated by seed in common garden earth. *Sida Americana*, D. C. Sp. 138.

63. Asiatic Mulberry-leaf (*A. Asiaticum*, Linnæus). A stove annual, two feet high, from the East Indies in 1768: leaves heart-shaped, egg-oblong, toothed, velvety; flowers, in July and August, small, yellow, on foot-stalks longer than the leaf-stalks; capsules twenty, woolly, three-seeded; propagated by seed in common garden earth.

64. Avicenna's Mulberry-leaf (*A. Avicennæ*, Gærtner). A hardy annual, three or four feet high, from India in 1596: leaves roundish, heart-shaped, taper-pointed, cottony; flowers deep yellow, on stalks shorter than the leaf-stalks; capsules fifteen, abrupt, hairy, two-beaked, three-seeded. *Sida Abutilon*, Linnæus.—D. C. Sp. 139.

65. Curled Mulberry-leaf (*A. crispum*, Linnæus). A stove annual, one foot high, from Carolina in 1726: leaves heart-shaped, taper-pointed, nicked, rather cottony; flowers, in July and August, small, white, on solitary foot-stalks longer than the leaf-stalks, and when in fruit bent backwards; capsules twelve to thirteen, three-seeded; fruit bulged, awnless, and wavedly curled, with a hairy kernel; propagated by seed in common garden earth. *Sida amplexicaulis*, Lamarck. *Sida crispa*, D. C. Sp. 131.

66. Hairy Mulberry-leaf (*A. hirtum*, Lamarck). A stove annual, three feet high, from the East Indies in 1820: leaves roundish, heart-shaped, taper-pointed, toothed, covered with white cotton beneath; flowers, in July and August, pale yellow, on stalks longer than the leaf-stalks; capsules fifteen to seventeen, shorter than the calyx; branches hairy; propagated by seed in common garden earth. *Sida pilosa*, L'Heritier. *Sida hirta*, D. C. Sp. 147.

67. Indian Mulberry-leaf (*A. Indicum*, Linnæus). An evergreen stove annual, two feet high, from the East Indies in 1739: leaves heart-shaped, somewhat lobed, soft; flowers, in July and August, yellow, on erect foot-stalks three times longer than the leaf-stalks; capsules thirteen to fifteen, rough, three-seeded; propagated by seed in common garden earth. *Abutilum elongatum*, Mœnch.

68. Jacquin's Mulberry-leaf (*A. Jacquini*, G. Don). A stove annual, four feet high, from Jamaica: leaves heart-shaped, undivided, taper-pointed, nicked and downy; flowers yellow, on stalks as long as the leaf-stalks; capsules ten, three-seeded. *Sida Abutiloides*, Jacquin; *Lavatera Americana*, Linnæus.—G. Don's Syst. Gard., I. p. 503.

69. Awnless Mulberry-leaf (*A. muticum*, Delille). A plant one foot high, from Upper Egypt: leaves roundish, heart-shaped, rather taper-pointed, coarsely toothed, soft; flowers yellow, on foot-stalks shorter than the leaf-stalks; capsules twenty-five to thirty, awnless. *Sida mutica*, D. C. Sp. 137.

70. Poplar-leaved Mulberry-leaf (*A. populifolium*, Lamarck). A stove or hothouse annual, from two to six feet high, from the East Indies in 1820: leaves roundish, heart-shaped, taper-pointed, unequally toothed; flowers, in July and August, yellow, on stalks longer than the leaf-stalks; capsules eleven to nineteen, three-seeded; stem dark purple; propagated by seed in common garden earth. *Sida Eteromischos*, Cavanilles; *Sida populifolia*, Cavanilles.—Lam. Dict. I. p. 7. D. C. Sp. 146.

71. Sonnerat's Mulberry-leaf (*A. Sonneratianum*, Cavanilles). A stove plant, said to be biennial, two feet high, from the Cape of Good Hope in 1806: leaves roundish, heart-shaped, taper-pointed, toothed, cottony; flowers, in June and July, on solitary stalks longer than the leaves; capsules nine, three-seeded; propagated by seed in common garden earth.—Cav. Diss., I. p. 29, T. 6, f. 4. D. C. Sp. 142.

72. Linden Mulberry-leaf (*A. tiliæfolium*, Fischer). A green-house annual, two feet high, from China and Thibet in 1821: leaves large, heart-shaped, roundish, with a broad recess, taper-pointed, toothed, soft, and downy; flowers, in July and August, yellow, on foot-stalks shorter than the leaf-stalks; capsules fifteen, hairy, two-awned; propagated by seed in common garden earth. *Sida tiliæfolia*, D. C. Sp. 136.

73. Abrupt Mulberry-leaf (*A. truncatum*, Cavanilles). A stove annual, two feet high, from St. Domingo: leaves roundish, heart-shaped, abrupt, and blunt at the tip, toothed, cottony; flowers primrose-yellow, on stalks longer than the leaf-stalks; capsules nine, awnless, one or many-seeded.—Cav. Diss., I. p. 35, T. 6, f. 7.

V.

CAPSULES MORE THAN NINE, BUT THE NUMBER NOT KNOWN.

1. *Shrubs.*

74. Monte Video Mulberry-leaf (*A. affine*, Sprengel). A stove shrub from Monte Video: leaves heart-shaped, oblong, nicked, toothed, hoary beneath; flowers in terminal clusters; calyx silky; capsule awnless.

75. Crozier Mulberry-leaf (*A circinnatum*, Willdenow). A stove shrub, two feet high, from South America: leaves roundish, heart-shaped, rather acute, nearly entire, cottony; flowers yellow, on one-flowered longish stalks; capsule bladdery. *Sida circinnata*, Spreng. Syst. III. p. 119.

76. Eatable Mulberry-leaf (*A. esculentum*, St. Hilaire). A stove shrub, seven feet high, from Brazil, where the flowers are dressed and eaten with their vianda: leaves heart-shaped, taper-pointed, toothed, covered with spreading down above, and cottony beneath; flowers purple, on solitary, axillary foot-stalks; capsules three-seeded.—St. Hil. Fl. Bras., I. p. 204.

77. Grand-flowered Mulberry-leaf (*A. grandiflorum*, G. Don). A stove shrub, one to two feet high, from Guinea: leaves heart-shaped, lobe-toothed, roundish, on very long leaf-stalks; flowers large, yellow, solitary, one-flowered stalks; capsules numerous.—G. Don, Syst. Gard. I. p. 504.

78. Ibarran Mulberry-leaf (*A. Ibarrense*, Humboldt). A stove shrub, six feet high, from South America: leaves on long stalks, roundish, deeply heart-shaped, taper-pointed, nicked, toothed, hoary above, white beneath; flowers pale yellow, on axillary two-flowered stalks; capsules three-seeded.—*Sida Ibarrensis*, D. C. Sp. 143.

79. Stiff Mulberry-leaf (*A. rigidum*, G. Don). A stove shrub, two to four feet high, from Guinea: leaves oval, blunt, generally taper-pointed, unequally toothed, on short leaf-stalks; flowers large, yellow, on solitary one-flowered stalks of the same length as the leaves.

80. Showy Mulberry-leaf (*A. speciosum*, Willdenow). A stove shrub from Brazil: leaves heart-shaped, taper-pointed, nicked, toothed, cottony in stars; flowers rose-coloured, on longish, one-flowered twin-stalks; capsules awnless.

81. Velvety Mulberry-leaf (*A. velutinum*, G. Don). A stove shrub, two to four feet high, from Guinea: leaves egg-oblong, acute-toothed, rather heart-shaped at the base; flower-stalks solitary, one-flowered, longer than the leaves; the plant covered with soft down.

2. *Herbs.*

82. Clasping Mulberry-leaf (*A. amplexifolium*, Mocino). A stove perennial, one foot high, from Mexico: leaves heart-shaped, taper-pointed, nicked, upper ones without leaf-stalks, clasping the stem; flowers yellow, in panicles, terminal, and many-flowered.— Moc. Fl. Mex. Icon. ined. *Sida amplexifolia*, D. C. Sp. 132.

83. Twin-flowered Mulberry-leaf (*A. geminiflorum*, Humboldt). A stove perennial, two feet high, from the Caraccas; leaves egg-oblong, heart-shaped, taper-pointed, nicked, toothed, hairy; flowers from white to yellow, with thirteen pistils, on foot-stalks, in pairs, axillary and one-flowered; four nascent seeds (*ovula*) in each capsule. [A. C.]

ACACIA. This name is usually given to the Locust Tree, or White Laburnum (*Robinia pseud-Acacia*, Linnæus), which does not belong to the genus termed *Acacia* by botanists. See ACACIA TREE, page 41. [B. E.]

ACACIA, Necker (from the Greek, ακαζω, "I sharpen," many of the species being thorny). Acacia. *Polygamia Monœcia*, Linnæus; *Leguminosæ Mimoseæ*, Jussieu. Calyx four or five-toothed; the petals of the corolla four or five, either free or joined together; stamens from 10 to 200; seed-vessel a dry two-valved pod, not jointed, and juiceless.

a, The four-leaved calyx; *b*, five-leaved corolla; *c*, perfect flower, showing the stamens and pistils; *d*, seed-pod, opened

Linnæus united the genera *Acacia*, *Inga*, and *Mimosa*, under the genus *Mimosa*; but they are now separated, because they possess characters sufficiently important to constitute distinct genera.

The Acacias are shrubs and trees, varying in habit and foliage; and by their beauty and elegance they contribute greatly to adorn the countries in which they grow. They are found chiefly in the tropical regions of Asia, Africa, and America.

I.

LEAF-STUMP ACACIAS (*Phyllodineæ*). LEAVES OF TWO FORMS; IN YOUNG PLANTS DOUBLY-WINGED, BUT ON FULL-GROWN PLANTS THE LEAFLETS ARE NOT EVOLVED, AND THERE ONLY REMAINS THE DILATED LEAF-STUMP (*phyllodium*).

1. A. verticillata. 2. Young plant of the same. 3. A. suaveolens. 4. A. linifolia. 5. A. calamifolia. 6. A. vestita.

1. CAPITATE: *Flowers yellow, collected into globose heads, with a solitary head on each flower-stalk; leaf-scales* (stipulæ) *thorny.*

1. Wing-stemmed Acacia (*A. alata*, R. Brown). An evergreen, ornamental, greenhouse plant, from six to ten feet high, from New Holland in 1803: leaf-stumps decurrent, one-ribbed, ending in a thorn; leaf-scales permanent; flowers, from April to July, yellow, in heads, solitary or in pairs; propagated by cuttings in sandy peat.—Bot. Reg., 396.

2. Armed Acacia (*A. armata*, R. Brown). An evergreen, greenhouse, ornamental shrub, about ten feet high, from New Holland in 1803: branches hairy; leaf-scales permanent; leaf-stumps obliquely egg-oblong, quite entire, one-ribbed; flowers, from April to June, yellow; heads of flowers solitary; pods velvety; propagated by seeds in sandy peat.—Bot. Mag., 1653. D. C. Sp. 8.

3. Asparagus-like Acacia (*A. asparagoides*, Cunning-

ham). An ornamental, evergreen, greenhouse shrub, about five feet high, from New Holland in 1818: branches smooth, shining, diffuse; leaf-scales permanent; leaf-stumps line-like, sickle-shaped, stiff, sharp-pointed, alternate, and clustered; flowers, from March to June, yellow; heads of flowers axillary and solitary; propagated by cuttings in sandy peat.—Field's N. S. Wales, p. 343.

4. Two-flowered Acacia (*A. biflora*, R. Brown). An ornamental, evergreen, greenhouse shrub, from New Holland in 1803: branches hairy; leaf-scales permanent; leaf-stumps triangular, one-ribbed, the upper margin having one gland-bearing tooth; heads solitary, on short foot-stalks, two-flowered; flowers, from March to July, yellow; propagated by seeds in sandy peat.—D. C. Sp. 4.

5. Brown's Acacia (*A. Brownei*, Steudel). An evergreen, greenhouse, ornamental shrub, about six feet high, from New South Wales in 1796: branches smooth and shining; leaf-scales small, temporary; leaf-stumps line-like, awl-shaped, sharp-pointed, pungent, distant, spreading; flowers, from March to August, yellow; heads solitary, on stalks shorter than the leaf-stumps; propagated by cuttings in sandy peat. *A. acicularis*, R. Brown, not Willdenow; *A. juniperina*, Sieber, No. 463.—D. C. Sp. 11.

6. Deceiving Acacia (*A. decipiens*, R. Brown). An evergreen, greenhouse, ornamental shrub, three feet high, from New Holland in 1803: branches smooth and shining; leaf-scales temporary; leaf-stumps triangular, and somewhat trapezoid, the upper margin having one acute gland-bearing tooth; flowers, from March till June, yellow; heads many-flowered, usually solitary; propagated by cuttings in sandy peat.—Bot. Mag., 1745. D. C. Sp. 3.

7. Delta Acacia (*A. deltoidea*, Cunningham). An evergreen, greenhouse, ornamental shrub, from three to six feet high, from New Holland in 1824: leaf-scales needle-shaped, in pairs; leaf-stumps axe-shaped, smooth, ending in a thorn, many-ribbed; branches downy; flowers in solitary heads, on foot-stalks which are longer than the leaf-stumps; propagated by cuttings in sandy loam.—Cunn. MSS.

8. Axe-shaped Acacia (*A. dolabriformis*, Wendland). A greenhouse, ornamental, evergreen shrub, about five or six feet high, from New Holland in 1818: branches somewhat angular; leaf-scales temporary or wanting; leaf-stumps line-like, rather sickle-shaped; propagated by cuttings in sandy loam.—Wendl., No. 38. D. C. Sp. 2.

9. Urchin Acacia (*A. echinula*, De Candolle). An evergreen, greenhouse, ornamental shrub, from three to six feet high, from New Holland in 1824: branches hairy; leaf-scales bristle-shaped, permanent; leaf-stumps line-like, awl-shaped, pungent, sharp-pointed; flowers from March to July; heads of flowers solitary; the flower-scales (*bracteæ*) ending in a thorn-like bristle, each longer than the corolla; propagated by cuttings in sandy peat. *A. juniperina*, Sieber, No. 447.—D. C. Sp. 12.

10. Genista-leaved Acacia (*A. genistifolia*, Link). An evergreen, greenhouse, ornamental shrub, about three feet high, from New South Wales in 1825: leaf-stumps line-like, awl-shaped, pungent, close together; leaf-scales minute, thorny; flower-stalks solitary; flowers, from March to August, yellow; heads of flowers solitary; propagated by cuttings in sandy peat.—D. C. Sp. 9.

11. Spear-leaved Acacia (*A. hastulata*, Smith). An evergreen, greenhouse, ornamental shrub, from three to six feet high, from New Holland in 1824: leaf-scales bristle-like, erect, permanent; leaf-stumps smooth and shining, rhomboid, with a central rib, the upper margin having one gland, bearing a blunt tooth; flowers from April to June; heads solitary, three or four-flowered; propagated by cuttings in sandy peat.—D. C. Sp. 5.

12. Juniper-leaved Acacia (*A. juniperina*, Willdenow). An ornamental, evergreen, greenhouse shrub, about six or eight feet high, from New Holland in 1790; branches downy; leaf-scales bristle-like, permanent; leaf-stumps line-like, awl-shaped, rigid, sharp-pointed; flowers, from March to June; heads of flowers solitary; propagated by cuttings in sandy loam. *A. ulicifolia*, Wendland; *A. verticillata*, Sieber.—Bot. Cab., 398. D. C. Sp. 10.

13. Ribbed Acacia (*A. nervosa*, De Candolle). An ornamental, evergreen, greenhouse shrub, from three to six feet high, from New Holland in 1824: leaf-scales permanent; leaf-stumps egg-oblong, terminated at both ends, one central rib, and with rib-formed entire margins; flowers, from April to June, yellow; heads usually in pairs, on foot-stalk five or eight-flowered; propagated by cuttings in sandy peat.—D. C. Sp. 6.

14. Bird Acacia (*A. Ornithophora*, Sweet). An evergreen, greenhouse, ornamental shrub, from four to eight feet high, from New Holland in 1824: branches hairy; leaf-scales permanent, somewhat shorter than the leaf-stumps, which are obliquely-oblong, spear-shaped, one-ribbed, ending in a hooked beak at the tip; the whole leaf-stump like the outline of a bird; flowers, from April to June, on foot-stalks, in heads, solitary or in pairs, and numerous; propagated by cuttings in sandy peat.—Sweet's Flora Austral., 24.

15. Paradoxical Acacia (*A. paradoxa*, De Candolle). An ornamental, evergreen, greenhouse shrub, from three to six feet high, from New Holland: leaf-scales tending to become thorny and permanent; leaf-stumps obliquely-oblong, lance-shaped, entire, waved, and one-ribbed; branches smooth and clammy; flowers, from April to June, solitary, in heads five to eight-flowered; propagated by cuttings in sandy peat. *A. undulata*, Willdenow.—D. C. Sp. 7.

16. Dagger-leaved Acacia (*A. puginiformis*, Wendland). An ornamental, evergreen, greenhouse shrub, about six feet high, from New Holland in 1818: branches smooth and shining; leaf-scales very acute and small; leaf-stumps line-like and rounded; flowers, from March till July, yellow; heads of flowers solitary, on stalks three times shorter than the leaf-stumps; propagated by cuttings in sandy peat.—Wendl. Diss., No. 26, T. 9. D. C. Sp. 13.

17. Trapezoid Acacia (*A. trapezoidea*, De Candolle). A shrub, four or six feet high, from New Holland in 1810: leaf-scales temporary; leaf-stumps irregularly trapezium-like, having on the upper margin two blunt gland-bearing teeth; flowers, from March to June, yellow, in heads, axillary, usually solitary, without flower-stalks; propagated by cuttings in sandy peat. Considered by some as a variety only of *A. decipiens*.—D. C. Sp. 3, var. *β*.

2. Flowers collected into globose heads, with a solitary head on each flower-stalk; flowers yellow; leaf-scales not thorny, but either small or wanting, and generally remaining only for a time.

18. Two-edged Acacia (*A. anceps*, De Candolle). An ornamental, evergreen shrub, about five feet high, from New Holland in 1820: branches angularly two-edged; leaf-stumps inversely egg-oblong, entire, one rib in the middle; flowers, from April to June, in single heads; propagated by cuttings in sandy peat.—D. C. Sp. 26.

19. Brunian Acacia (*A. Brunoni*, or *A. Brunioides*, Cunningham). An ornamental, evergreen, greenhouse shrub, about three or four feet high, from New South Wales in 1824: leaf-stumps disposed in something like whirls, crowded, very short, flattish, awl-shaped, sharp-pointed; flowers, from April to June, yellow, on stalks double the length of the leaf-stumps; propagated by cuttings in sandy peat.—Cunn. MSS.

20. Reed-leaved Acacia (*A. calamifolia*, Sweet). A shrub, about four feet high, from New Holland in 1823: leaf-stumps thread-shaped, flattish, spreading, ending in a small sharp point, bent inwards at the top; flowers, in June, yellow, solitary, on stalks much shorter than the leaf-stumps. *A. uncinata*, Bot. Cab.—Bot. Reg., 839. D. C. Sp. 31.

21. Spoon-leaved Acacia (*A. cochlearis*, Wendland). An ornamental, evergreen, greenhouse shrub, four to six feet high, from New Holland in 1818: leaf-stumps line-like, spear-shaped, many-ribbed at the base, somewhat covered with long soft hairs, entire, and sharp-pointed; flowers, from April to June; pod four to eight-seeded; propagated by

cuttings in sandy peat. *Mimosa cochlearis*, Labillardiere. —Wendl. Diss. No. 7. D. C. Sp. 24.

22. Leathery Acacia (*A. coriacea*, De Candolle). An ornamental, evergreen, greenhouse shrub, four to six feet high, from New Holland in 1824: leaf-stumps very long, line-like, entire, ribless, thick, and leathery; when young, downy, at first yellowish, afterwards ash-coloured; flowers, in May and June, yellow, solitary; propagated by cuttings in sandy peat.—D. C. Sp. 25.

23. Cunningham's Acacia (*A. Cunninghami*). An ornamental, evergreen, greenhouse shrub, about eleven feet high, from New Holland in 1823: leaf-stumps line-like, sickle-formed, sharp-pointed, two to three-ribbed, double the length of the flower-stalks; flowers, from April to June, yellow; heads of flowers solitary, axillary; pods very narrow; propagated by cuttings in sandy peat. *A. taxifolia*, Bot. Cab. 1225, but not of Willdenow.—G. Don, Syst. Gard. 2, p. 404.

24. Cyclops Acacia (*A. Cyclops*, Cunningham). An ornamental, evergreen, greenhouse shrub, four to six feet high, from New Holland in 1824; leaf-stumps oblong, lance-shaped, blunt, three to seven-ribbed, with a gland in front on the upper margin; flowers, from April to June, yellow; heads of flowers few, single, axillary; flower-stalks shorter than the leaf-stumps; propagated by cuttings in sandy peat.

25. Diffuse Acacia (*A. diffusa*, Ker). An evergreen, ornamental, greenhouse shrub, two feet high, from New South Wales in 1818: leaf-stumps line-like, one-ribbed, ending in a slanting point, with little thorns along the lower margin; branches angular, smooth, and widely spread; flowers in heads, and commonly twin; propagated by cuttings in sandy peat. *A. prostrata*, Bot. Reg., 631; *A. daviesioides*, Cunningham.—Bot. Cab., 634. D. C. Sp. 14.

26. Dodonean Acacia (*A. dodoneæfolia*, Willdenow). A greenhouse, evergreen, ornamental shrub, from four to eight feet high, from New Holland in 1817: without leaf-scales; leaf-stumps clammy, line-like, spear-shaped, somewhat bent like a sickle; branches clammy; flowers, from March to June, yellow, in twin heads on long foot-stalks; propagated by seeds in sandy loam. *Mimosa dodoneæfolia*, Persoon; *Acacia viscosa*, Wendland; *A. metrosiderosifolia*, Bricher.—D. C. Sp. 20.

27. Glandless Acacia (*A. eglandulosa*, De Candolle). A greenhouse, ornamental, evergreen shrub, from four to six feet high, from New Holland in 1824: leaf-stumps line-like, spear-shaped, entire, glandless, many-ribbed at the base; flowers, from March to June, yellow, solitary, on longish stalks; propagated by cuttings in sandy peat.—D. C. Sp. 22.

28. Long-leaved Acacia (*A. elongata*, Sieber). An ornamental, evergreen, greenhouse shrub, five to ten feet high, from New South Wales in 1817: leaf-stumps three inches long, and one line broad, line-like, and sickle-shaped, three-ribbed, ending in a small hard point, having a gland on the upper margin at the base; flowers, from March to May, yellow; corolla five-cleft. *A. hebecephala*, Cunningham. —Sieb. Pl. exsic. Nov. Hol., No. 443. D. C. Sp. 29.

29. Notch-leaved Acacia (*A. emarginata*, Wendland). An ornamental, evergreen, greenhouse shrub, from six to ten feet high, from New Holland in 1824: without leaf-scales; leaf-stumps line-like, and spatula-shaped, thinnest at the base, having a small notch at the tip, sharp-pointed; flowers, from March to July, yellow, in heads, commonly twin, with flower-stalks longer than the heads; propagated by cuttings in sandy peat. De Candolle supposes it to be a variety of *A. saligna*.—Wendl. Diss. No. 17. D. C. Sp. 17.

30. Strong-scented Acacia (*A. graveolens*, Cunningham). An ornamental, evergreen, greenhouse shrub, ten to fifteen feet high, from New Holland in 1820: leaf-stumps lance-shaped, tapering at both ends, shining, two-ribbed, with a gland on the upper margin; branches erect when young, clammy; flowers, from April till June, yellow, usually twin, axillary, on stalks much shorter than the leaf-stumps; propagated by seed in sandy loam.—Bot. Cab., 1460.

31. Hispid Acacia (*A. hispidula*, Willdenow). An evergreen, greenhouse, ornamental shrub, two feet high, from New South Wales in 1794: without thorns; leaf-stumps without foot-stalks, oblong, one-ribbed, tapering to a stiff point, rough, and furnished with little teeth; flowers, in April and May, yellow, and in globose-stalked spikes; pod egg-oval oblong, two-seeded; propagated by cuttings in sandy peat. *Mimosa hispidula*, Smith.—Bot. Cab., 836.

32. Woolly Acacia (*A. lanigera*, Cunningham). An ornamental, evergreen, greenhouse shrub, six feet high, from New Holland: covered with long loose hair; leaf-stumps lance-shaped, acute, stiff, ribbed, sickle-like, ending in a small sharp point; flowers, from March to May, yellow, in axillary twin heads; pod very woolly; propagated by cuttings in sandy peat.—Bot. Mag., 2922.

33. Laurel-leaved Acacia (*A. laurifolia*, Willdenow). An evergreen, ornamental, bark-stove tree, from twenty to twenty-six feet high, from Tanna in 1775: leaf-stumps slantingly egg-oblong, seven to eight-ribbed, notched at the tip and slanting at the base; flowers, in May and June, yellow; pod sickle-like; propagated by cuttings in sandy peat. *Mimosa simplicifolia*, Linnæus; *M. Mangium*, Foster.—D. C. Sp. 28.

34. Leprous Acacia (*A. leprosa*, Sieber). A greenhouse, evergreen, ornamental shrub, about four or eight feet high, from New Holland in 1817: leaf-scales almost wanting; leaf-stumps line-like, spear-shaped, one-ribbed, and leprously dotted; flowers two to three together, axillary, on foot-stalks shorter than the heads; propagated by seeds in sandy loam.—Sieb. Pl. exs. Nov. Holl. No. 2455. D. C. Sp. 19.

35. Line-leaved Acacia (*A. lineata*, Cunningham). An ornamental, evergreen, greenhouse shrub, four to six feet high, from New Holland in 1824: leaf-stumps half an inch long, line-like, terminating in a slanting, hardened, sharp point, glandless, one-ribbed; branches and leaf-stumps hairy; flowers, from March to May, yellow, commonly twin, on thread-shaped flower-stalks; propagated by cuttings in sandy peat.—Cunn. MSS.

36. Mangium Acacia (*A. Mangium*, Willdenow). An ornamental, evergreen, bark-stove tree, ten to twenty feet high, from the East Indies in 1820: leaf-stumps egg-oblong, acute, thinnest at the base, longitudinal rib parallel to the lower margin; flowers, yellow, usually solitary; propagated by cuttings in sandy peat. *Mangium montanum*, Rumph. Am. iii. p. 123, T. 81. D. C. Sp. 87.

37. Many-ribbed Acacia (*A. multinervia*, De Candolle). An ornamental, evergreen, greenhouse shrub, four to six feet high, from New Holland in 1824: leaf-stump many-ribbed, and furnished with a gland-like tooth on the upper margin; flowers, from March to June, yellow, on short flower-stalks.—D. C. Sp. 21.

38 Four-sided Acacia (*A. quadrilateralis*, De Candolle). An evergreen, ornamental, greenhouse shrub, eleven feet high, from New Holland in 1820: leaf-stumps thread-shaped, four-angled; flowers sometimes in solitary heads, sometimes clustered; propagated by cuttings in sandy peat. *A. calamifolia*, Sieber; *A. arida*, Cunningham.

39. Stiff Acacia (*A. rigens*, Cunningham). A greenhouse, annual, evergreen shrub, five to eight feet high, from New Holland in 1824: leaf-stumps three or four inches long, thread-shaped, flattish, terminating in a small sharp point at the top, three-ribbed at the base, a gland-bearing tooth on the upper margin; flowers, from March to May, yellow, axillary, single, on scaly flower-stalks; propagated by cuttings in sandy peat.—Cunn. MSS.

40. Runciform Acacia (*A. runciformis*, Cunningham). An ornamental, evergreen, greenhouse shrub, five to six feet high, from New South Wales: leaf-stumps line-like, spear-shaped, rather sickle-like, ending in a stiff, hooked, sharp, little point, one-ribbed; flowers, from April to June, yellow, axillary, on short flower-stalks; propagated by cuttings in sandy peat.—Cunn. MSS.

41. Willow-leaved Acacia (*A. saligna*, Wendland). An ornamental, evergreen, greenhouse shrub, ten feet high, from New Holland in 1818: leaf-scales nearly wanting; leaf-stumps line-like, thinnest at each end, entire, almost rib-

less; flowers, from March to July, yellow, on short foot-stalks; propagated by cuttings in sandy peat. There are two varieties, the one with broad, the other with narrow leaf-stumps. *Mimosa saligna*, Labillardiere.—Wendl. Diss., No. 16. D. C. Sp. 16.

42. Double-headed Acacia (*A. stricta*, Willdenow). An ornamental, evergreen, greenhouse shrub, two to six feet high, from New South Wales in 1790: leaf-stumps line-like, spear-shaped, narrowest at the base, blunt; flowers, from February to May, yellow; spikes globose, axillary, stalked, double; plant without thorns; propagated by cuttings in sandy peat. *Mimosa stricta*, Bot. Reg., 53. *Mimosa sauveolens*, Desfontaines.—D. C. Sp. 16.

43. Furrow-leaved Acacia (*A. sulcata*, R. Brown). An evergreen, ornamental, greenhouse shrub, two to four feet high, from New Holland in 1803: branches rather tapering and smooth; leaf-stumps line-like, tapering, furrowed, and sharp-pointed; flowers, from May to June, yellow, in heads, commonly twin; calyx five-parted; petals five; propagated by cuttings in sandy loam.—D. C. Sp. 15.

44. Three-ribbed Acacia (*A. trinervata*, Sieber). An ornamental, evergreen, greenhouse shrub, about six feet high, from New Holland in 1820: leaf-stumps half an inch long, line-like, sharp-pointed, smoothish, with three ribs running the whole length, without any gland on the side; flowers, from April to June, yellow, in some instances in single heads, in others disposed in short clusters on long foot-stalks; propagated by cuttings in sandy loam.—Sieber, No. 445. D. C. Sp. 30.

45. Wave-leaved Acacia (*A. undulæfolia*, Cunningham). An ornamental, evergreen, greenhouse shrub, three feet high, from New South Wales in 1824: leaf-stumps one inch long, slantingly egg-oblong, waved, and margined, one-ribbed; branches hairy; flowers, from April to June, yellow, very numerous, in axillary single heads; foot-stalks larger than the leaf-stumps; propagated by seed in sandy peat.

46. Varnish Acacia (*A. vernicifiua*, Cunningham). An ornamental, evergreen, greenhouse shrub, three to six feet high, from New Holland in 1817: leaf-stumps line-like, spear-shaped, sickle-formed, thinnest at the base; flowers, from March to May, yellow, axillary, twin; propagated by cuttings in sandy peat.—Field's N. S. Wales, p. 344.

2. CAPITATO-RACEMOSE: *flowers yellow, collected into globose heads upon axillary foot-stalks; leaf-scales* (stipulæ) *of all hardly perceptible, or when present, without prickles or thorns.*

47. Fir Acacia (*A. abietina*, Willdenow). An ornamental, evergreen, greenhouse shrub, four to six feet high, from New Holland in 1823: heads of flowers longer than the leaves; propagated by cuttings in sandy peat. De Candolle supposed it to be a variety of the *A. linifolia*.—D. C. Sp. 51.

48. Hooked Acacia (*A. aduncа*, Cunningham). An ornamental, evergreen, greenhouse shrub, three to six feet high, from New Holland: leaf-stumps straight, line-like, thinnest at the base, rounded at the top, one-ribbed, having a gland on the upper margin, between the middle and the base; heads of flowers crowded, axillary, and terminal; propagated by cuttings in sandy peat.—Cunn. MSS.

49. Pleasing Acacia (*A. amæna*, Wendland). An ornamental, evergreen, greenhouse shrub, six feet high, from New Holland in 1820: very like the *A. heterophylla*, from which it differs in the clusters, being one-half shorter than the leaf-stumps; flowers, from April to June, yellow; propagated by cuttings in sandy peat.—Wendl. Diss., No. 8, T. 4.

50. Narrow-leaved Acacia (*A. angustifolia*, Wendland). An ornamental, evergreen, greenhouse shrub, from two to six feet high, from New Holland in 1818; the leaf-stumps line-like, somewhat tapering to the base, acute, sharp-pointed, one-ribbed, entire; calyx four-toothed; seed-organ cottony; flowers, from April to May, yellow; propagated by cuttings in sandy peat. *A. odorata*, Desvaux; *Mimosa angustifolia*, Jacquin.—Bot. Cab., 768. D. C. Sp. 49.

51. Astringent Acacia (*A. astringens*, Cunningham). An ornamental, evergreen, greenhouse shrub, from New South Wales, and five to ten feet high: leaf-stumps three to four inches long, one inch broad, obliquely egg-oblong, rather arched, feather-ribbed, smooth, and having one gland on the upper margin at the base; propagated by cuttings in sandy peat.—Cunn. MSS.

52. Two-ribbed Acacia (*A. binervata*, De Candolle). An ornamental, evergreen, greenhouse shrub, four to eight feet high, from New Holland in 1824: leaf-stumps oblong, tapering at each end, with a gland on the upper margin at the base; two-ribbed the whole length of the leaf-stumps; flowers, in clusters, shorter than the leaf-stumps; propagated by cuttings in sandy peat.—D. C. Sp. 43.

53. Two-veined Acacia (*A. bivenosa*, De Candolle). An ornamental, evergreen, greenhouse shrub, three feet high, from New Holland in 1824: leaf-stumps oblong, blunt, somewhat thinnest at the base, entire, having two fine ribs; flowers, from April to June, yellow, four-cleft, in loose clusters, which are rather longer than the leaf-stumps; propagated by cuttings in sandy peat.—D. C. Sp. 44.

54. Short-leaved Acacia (*A. brevifolia*, Loddiges). An ornamental, evergreen, greenhouse shrub, four feet high, from New South Wales in 1820: leaf-stumps elliptical, ending in a thorn-like small point, one-ribbed, smooth, with a gland on one side; clusters longer than the leaves; flowers, in April, May, and June; propagated by cuttings in sandy peat.—Bot. Cab. 1235.

55. Box-leaved Acacia (*A. buxifolia*, Cunningham). An ornamental, evergreen, greenhouse shrub, six feet high, from New Holland in 1824: leaf-stumps egg-oblong, acute, having one gland on the upper margin; clusters axillary, and twice the length of the leaf-stumps; propagated by cuttings in sandy peat. *A. conferta.*

56. Thick-leaved Acacia (*A. crassiuscula*, Wendland). An ornamental, evergreen, greenhouse shrub, about five or ten feet high, from New Holland in 1824: leaf-stumps line-like, one-ribbed, thickish, entire, tapering at the base, rounded at the top, and terminating in a small sharp point, bent inwards; flowers, from April to June, yellow, five-cleft; heads commonly three in the cluster.—Wendl. Diss. No. 20, T. 8. D. C. Sp. 47.

57. Cultriform Acacia (*A. cultriformis*, Cunningham). An ornamental, evergreen, greenhouse shrub, from four to six feet high, from New South Wales: branches smooth and angular; leaf-stumps shaped like a pruning knife, furnished with one rib and one gland; flowers, in crowded heads, either in axillary or terminal clusters; propagated by cuttings in sandy peat.—Cunn. MSS.

58. Falcate Acacia (*A. falcata*, Willdenow). An ornamental, evergreen, greenhouse shrub, eight feet high, from New Holland in 1790: leaf-stumps oblong, bent like a sickle, acute, one-ribbed, glandless; a longitudinal nerve parallel to the upper margin, and contiguous to it; flowers, from May to June, yellow, heads rarely solitary; propagated by cuttings in sandy peat. *Acacia obliqua*, Desvaux; *Mimosa falcata*, Persoon.—D. C. Sp. 33.

Var. a. Leaf-stumps very acute, and the heads of flowers in clusters.

Var. b. Leaf-stumps bluntish, and the heads of flowers generally solitary.

59. Sickle-leaved Acacia (*A. falciformis*, De Candolle). An ornamental, evergreen, greenhouse shrub, six or eight feet high, from New Holland in 1818: leaf-stumps five to six inches long and eight to nine lines broad, oblong, bent like a sickle, bluntish at the top, one-ribbed; a gland in front on the upper margin; flowers, from April to June, yellow; pod two inches long; propagated by cuttings in sandy peat.

60. Scurfy Acacia (*A. furfuracea*, G. Don). An ornamental, evergreen, greenhouse slender shrub, from New Holland in 1824, four feet high: leaf-stumps elliptic or egg-oblong, smooth, oblique, terminating in a small sharp point;

flowers from April to June, yellow, upright; pod covered with white powder; propagated by cuttings in sandy peat. *A. dealbata*, Cunningham, not Link; *A. leucolobia*, Sweet.—G. Don's Syst. Gard. 2, p. 405.

61. Fringed Acacia (*A. fimbriata*, Cunningham). An ornamental, evergreen, greenhouse shrub, from four to six feet high, from New South Wales: the leaf-stumps an inch and a half long and two lines broad, straight, line-like, blunt, having a little sharp point, one-ribbed in the middle, and one gland on the upper margin at the base; both the branches and leaves fringed; clusters axillary.—Cunn. MSS.

62. Variable-leaved Acacia (*A. heterophylla*, Willdenow). An ornamental, evergreen, bark-stove shrub, five feet high, from New Holland in 1824: leaf-stumps line-like, thinner at both ends, rather sickle-like, many-ribbed; heads, two or three in each cluster; sometimes two-winged leaves at the tops of the branches; flowers, from April to June, yellow; propagated by cuttings in sandy peat. *Mimosa heterophylla*, Lamarck, Dict. i. 14, exclusive of variety *β*.

63. Flax-leaved Acacia (*A. linifolia*, Willdenow). An ornamental, evergreen, greenhouse shrub, four to six feet high, from New Holland in 1790: the leaf-stumps narrow, line-like, sharp-pointed. one-ribbed, entire; clusters the length of the leaves; flowers in May and June, yellow; calyx wavingly five-toothed; seed-organ smooth; propagated by cuttings in sandy peat. *Mimosa linifolia*, Ventenat; *M. linearis*, Wendland; Bot. Mag. 2168.—D. C. Sp. 50.

64. Lunate Acacia (*A. lunata*, Sieber). An ornamental, evergreen, greenhouse shrub, two to four feet high, from Van Diemen's Land in 1810: leaf-stumps one inch long, three lines broad, almost ribless, obliquely oblong, somewhat sickle-shaped, tapering at the base, with a little gland on the convex side; clusters longer than the leaves; propagated by cuttings in sandy peat.—Bot. Reg. 1352. D. C. Sp. 45.

65. Margined Acacia (*A. marginata*, R. Brown). An ornamental, evergreen, greenhouse shrub, six feet high, from New Holland in 1803: the leaf-stumps lance-shaped, longish, one-ribbed, one gland in front on the upper margin; heads in four-flowered clusters; flowers, from April to June, yellow, four-cleft; propagated by cuttings in sandy peat. Like the *A. myrtifolia*, but the seed organ is cottony.—D. C. Sp. 41.

66. Black-wooded Acacia (*A. melanoxylon*, R. Brown). An ornamental, evergreen, greenhouse shrub, five to ten feet high, from New Holland in 1808: leaf-stumps oblong, lance-shaped, blunt, entire, many-ribbed; flowers, from April to June, yellow; propagated by cuttings in sandy peat. *A. arcuata*, Sieber.—Bot. Mag. 1659.—D. C. Sp. 36.

67. Myrtle-leaved Acacia (*A. myrtifolia*, Willdenow). An ornamental, evergreen, greenhouse shrub, three to six feet high, from New Holland in 1789: the leaf-stumps oblong, lance-shaped, tapering much at the base, one-ribbed, one gland; seed-organ smooth and shining; flowers, from February to May, pale yellow, four-cleft, in few heads; propagated by cuttings in sandy peat. De Candolle thinks it not very distinct from the *A. lunata*.—Bot. Cab. 324.

68. Blunt-leaved Acacia (*A. obtusata*, Sieber). An ornamental, evergreen, greenhouse shrub, four to ten feet high, from New Holland in 1824: the leaf-stumps twenty lines long and three or four lines broad, oblong, wedge-shaped, one-ribbed, glandless, smooth; flowers, from April to June, yellow, four-cleft, in clusters shorter than the leaf-stumps; propagated by cuttings in sandy peat.—Sieber, No. 441.

69. Olive-leaved Acacia (*A. oleifolia*, Cunningham). An ornamental, evergreen, greenhouse shrub, four to six feet high, from New South Wales in 1824: branches hairy; leaf-stumps hairy, egg-oblong, oblique, sickle-shaped at the top, sharp-pointed; flowers, from April to June, yellow; propagated by cuttings in sandy peat. *A. uncinata*, Bot. Reg. 1332.—Cunn. MSS.

70. Drooping Acacia (*A. pendula*, Cunningham). An ornamental, evergreen, greenhouse shrub, five to ten feet high, from New South Wales in 1824: branches drooping; leaf-stumps three inches long and three lines broad, line-like, spear-shaped, rather arched, with one gland in front at the base, and two to three longitudinal ribs; flowers, in April, yellow; propagated by cuttings in sandy peat.—Cunn. MSS.

71. Wing-ribbed Acacia (*A. penninervis*, Sieber). An ornamental, evergreen, greenhouse shrub, six feet high, from New Holland in 1824: the leaf-stumps oblong, two to three inches long, and five to six lines broad, tapering at each end, a central rib with winged riblets running from it, and having one gland in front at the base; flowers, from April to June, yellow, in heads about the size of a pea; propagated by cuttings in sandy peat. *A. impressa*, Cunningham.—Bot. Mag. 2754. D. C. Sp. 35.

72. Podalyrian Acacia (*A. podalyriæfolia*, Cunningham). An ornamental, evergreen, greenhouse shrub, six feet high, from New South Wales in 1824: plant covered with hoary powder; leaf-stumps one inch long, and half an inch broad, elliptical, blunt, somewhat waved, one-ribbed; flowers, from March to May, yellow, on foot-stalks, forming panicles at the tops of the branches; propagated by cuttings in sandy peat.

73. Prominent Acacia (*A. prominens*, Cunningham). An ornamental, evergreen, greenhouse shrub, about five feet high, from New South Wales in 1824: the leaf-stumps growing in a straggling manner, one inch and a half long, one line and a half broad, line-like, lance-shaped, acute, one-ribbed, and furnished with rather a prominent gland on the upper margin at the base; flowers from February to June, yellow; clusters axillary or terminal; propagated by cuttings in sandy peat.—Cunn. MSS.

74. Pear-leaved Acacia (*A. pyrifolia*, De Candolle). An ornamental, evergreen, greenhouse shrub, about five to six feet high, from New Holland in 1824: leaf-scales hard and lasting; the leaf-stumps or leaves broad, oval, terminating a pungent and small sharp point, entire, with one rib in the centre, veiny; flowers, from April to June, yellow, and five-cleft; propagated by cuttings in sandy peat.—D. C. Sp. 42.

75. Reddish Acacia (*A. rubida*, Cunningham). An ornamental, evergreen, greenhouse shrub, four to six feet high, from New Holland in 1823: the leaf-stumps egg-oblong, spear-shaped, ending in a small oblique point, the rib and margin reddish; clusters small, axillary, and terminal; flowers, from April to June, yellow; propagated by cuttings in sandy peat.

76. Scapular Acacia (*A. scapuliformis*, Cunningham). An ornamental, evergreen, greenhouse shrub, five or six feet high, from New South Wales: leaf-stumps one inch long, and four lines broad, roundly triangular, or obliquely and inversely egg-oblong, sharp-pointed at the tip, one rib and one gland on the upper margin; flowers, from March to May, yellow, axillary, and terminal; propagated by cuttings in sandy peat.—Cunn. MSS.

77. Spire-podded Acacia (*A. spirolobus*, Labillardiere). An ornamental, evergreen, greenhouse shrub, eight feet high, from New Carolina: leaf-stumps lance-shaped, bent like a sickle, blunt, three-ribbed, tapering at each end; flowers in clusters, shorter than the leaf-stumps; propagated by cuttings in sandy peat.—Labill. Cal. p. 69, T. 69.

78. Sweet-scented Acacia (*A. suaveolens*, Willdenow). An ornamental, evergreen, greenhouse shrub, from New Holland in 1790, about six or eight feet high: the leaves or leaf-stumps line-like, rather tapering at the base, acute, one-ribbed, entire; flowers, from February to June; calyx five-parted; seed-organ smooth; pod oblong, fifteen lines long and five lines broad; propagated by cuttings in sandy peat. *Mimosa suaveolens*, Smith.—D. C. Sp. 48.

Var. a. A. platycarpa: pods nearly double the length of their breadth. *Mimosa ambigua*, Salisbury.

79. Awl-leaved Acacia (*A. subulata*, Bonpland). An ornamental, evergreen, greenhouse shrub, three to six feet high, from New Holland in 1824: the leaf-stumps very long and line-like, awl-shaped, sharp-pointed at the tip; flowers, from April to June, yellow; clusters one-half shorter than the leaves; calyx five-cleft; seed-organ cottony; propagated by cuttings in sandy peat.—Bonpl. Nov. T. 45.

80. Shady Acacia (*A. umbrosa*, Cunningham). An ornamental, evergreen, greenhouse shrub, four to six feet high, from New South Wales in 1824: leaf-stumps four inches

long, one inch broad, obliquely egg-oblong, spear-shaped, tapering at each end, three-ribbed, the rib inclined to one side, ending in a small sharp hooked point; flowers, from March to May, yellow; propagated by cuttings in sandy peat.

81. Clothed Acacia (*A. vestita*, Ker). An ornamental, evergreen, greenhouse shrub, six feet high, from New Holland in 1820: leaf-stumps obliquely elliptic, spear-shaped, one-ribbed; branches and leaf-stumps both covered with stiff hairs; flowers, from April to July, yellow, in clusters longer than the leaf-stumps, upper ones single; propagated by seeds in sandy loam. *A. conspicua*, Cunningham.—Bot. Reg. T. 698.—D. C. Sp. 40.

3. SPICATE: *flowers yellow, in cylindrical spikes; leaf-scales* (stipulæ) *in all either wanting or small, and without thorns or prickles.*

82. Greyish Acacia, (*A. cinerascens*, Sieber). An ornamental, evergreen, greenhouse shrub, four to ten feet high, from New Holland in 1824: branches angular, downy; leaf-stumps oblong, somewhat sickle-like, entire, many-ribbed, of which two or three ribs are conspicuous; spikes single; flowers, from March to May, yellow, four-cleft; propagated by cuttings in sandy peat.—Sieb. Pl. Exs., No. 448.

83. Spear-wood Acacia (*A. doratoxylon*, Cunningham). An ornamental evergreen tree, twenty feet high, from New Holland in 1823: leaf-stumps line-like, spear-shaped, sickle-formed, streaked, thinner at the base; flowers, in March and April; spikes almost without foot-stalks; propagated by cuttings in sandy peat.—Field's N. S. Wales, p. 345.

84. Bundle-flowered Acacia (*A. floribunda*, Willdenow). An ornamental, evergreen, greenhouse shrub, eight feet high, from New Holland in 1796: leaf-stumps line-like, spear-shaped, tapering at each end, entire, three to five leaf-ribs; flowers, from May to June; calyx wavedly four-toothed; petals five, united; seed-organ rather silky; propagated by cuttings in sandy peat. *Mimosa floribunda*, Ventenat; *A. longifolia*, Sieber.—D. C. Sp. 58.

85. Glaucescent Acacia (*A. glaucescens*, Willdenow). An ornamental, evergreen, greenhouse shrub, three feet high, from New Holland in 1790: leaf-stumps oblong, somewhat sickle-like, entire, many leaf-ribs, of which two or three are conspicuous; flowers, from February to June, yellow; spikes single; calyx five-toothed; propagated by cuttings in sandy peat.—D. C. Sp. 62.

86. Silky Acacia (*A. holosericea*, Cunningham). An evergreen bark-stove tree, twelve to twenty feet high, from New Holland in 1818: silky white in appearance; leaf-stumps six inches long and one broad, oblong spear-shaped, obliquely-wedge-shaped at the base, terminating in a small soft point at the top, three leaf-ribs, and having one gland on the upper margin; spikes commonly in pairs; propagated by seeds or cuttings in sandy peat. *A. heteromalla*, and *A. leucophylla*, Sweet.—Cunn. MSS.

87. Equal-woolled Acacia (*A. homomalla*, Wendland). An ornamental, evergreen, greenhouse shrub, about six feet high, from New Holland in 1822: leaf-stumps line-like, spear-shaped, tapering at each end, sickle-formed, three leaf-ribs; flowers, from May to July, yellow; calyx five-toothed; petals five, united; propagated by cuttings in sandy peat.—Wendl., No. 34, T. 13.—D. C. Sp. 59.

88. Interwoven Acacia (*A. intertexta*, Sieber). An ornamental, evergreen, greenhouse shrub, six feet high, from New Holland in 1824: leaf-stumps six inches long, half an inch broad, oblong-spear-shaped, bluntish, straight, tapering at the base, two leaf-ribs interwoven with riblets; spikes in pairs, one inch long; flowers, from April to June, four-cleft; propagated by cuttings in sandy peat. *A. obtusifolia*, and *A. thegonocarpa*, Cunningham.—Sieb. No. 453.

89. Line-leaved Acacia (*A. linearis*, Sims). An ornamental, evergreen, bark-stove shrub, about five or six feet high, from New Holland in 1819: leaf-stumps narrow, line-like, very long, one leaf-rib, entire; spikes numerous, axillary, and generally branched; petals four, distinct; calyx wavedly four-toothed; pod narrow, line-like; propagated by cuttings in sandy peat.—Bot. Mag. 2156.—D. C. Sp. 56.

Var. a. A. longissima, Wendland: the leaf-stumps longer and more spreading, but not erect.—Bot. Reg. 680.

A. linearis, Loddiges, Bot. Cab., 595. Is intermediate between the species and the variety.

90. Long-leaved Acacia (*A. longifolia*, Willdenow). An ornamental, evergreen, greenhouse shrub, from New Holland in 1792: leaf-stumps somewhat spear-shaped, tapering at each end, entire, two to three leaf-ribs at the base, the rest comparatively with many leaf-ribs; flowers, from March to May, yellow; calyx four-toothed; petals four, united; propagated by cuttings in sandy peat. *Mimosa longifolia*, Ventenat; *M. macrostachya*, Poiret; *A. floribunda*, Sieber.—D. C. Sp. 60.

Var. a. Leaf-stumps acute and narrower.—Bot. Mag. 1827.

Var. b. Leaf-stumps blunt and broader.—Bot. Mag. 2166.

91. Sword-pointed Acacia (*A. mucronata*, Willdenow). An ornamental, evergreen, greenhouse shrub, three to six feet high, from New Holland in 1818: leaf-stumps or leaves line-like and spatula-shaped, with one to three ribs, rounded, and sword-pointed at the top; flowers, from May to June, yellow; calyx wavedly four-toothed; petals four, united; seed-organ cottony; propagated by cuttings in sandy peat.

92. Sharp Cedar Acacia (*A. Oxycedrus*, Sieber). An ornamental, evergreen, greenhouse shrub, about eight feet high, from New Holland in 1823: leaf-scales thorny; leaf-stumps scattered or somewhat in whirls, line-like, spear-shaped, pointed, with three leaf-ribs, and smooth; flowers, from April to June, yellow, four-cleft, in spikes, solitary and longish; propagated by cuttings in sandy peat. *Mimosa puginiformis*, Cunningham; *A. taxifolia*, Loddiges.—Sieb. No. 457.—D. C. Sp. 54.

93. Knee-holly-leaved Acacia (*A. ruscifolia*, Cunningham). An ornamental, evergreen, greenhouse shrub, two or three feet high, from New Holland in 1824; flowers, from March to May, yellow; propagated by cuttings in sandy peat. Very like the *A. verticillata*, from which it differs in its more dwarfish habit, and by its cylindrical spikes.

94. Sophora-podded Acacia (*A. Sophoræ*, R. Brown). An evergreen tree, ten to twenty feet high, from New Holland in 1805: the leaf-stumps inversely egg-oblong, or lance-shaped, entire, many leaf-ribs; flowers, from April to May; spikes usually in pairs; calyx four-cleft; petals four, distinct; pods alternately elevated and depressed; sometimes with doubly-leaved wings at the tops of the branches. *Mimosa Sophoræ*, Labillardiere.—D. C. Sp. 64.

95. Yew-leaved Acacia (*A. taxifolia*, Willdenow). An ornamental, evergreen, greenhouse shrub, seven feet high, from Cochin China in 1824: leaf-stumps lance-shaped, in whirls of threes; flowers, from May to June, yellow; the spikes solitary and rather egg-shaped; the flowers four-cleft, with four stamens; propagated by cuttings in sandy peat. *Mimosa stellata*, Loureiro; *M. ternata*, Persoon.—D. C. Sp. 53.

96. Whirl-leaved Acacia (*A. verticillata*, Willdenow). An ornamental, evergreen, greenhouse shrub, eight or ten feet high, from Van Dieman's Land in 1780: leaf-stumps somewhat whirled, rather line-like, ending in a small pungent point; flowers, from March to May, yellow, five-cleft, in solitary, straightish, axillary spikes.—D. C. Sp. 55.

Var. a. A. glabra, smooth branches and flower-stalks; leaf-stumps line-like, awl-shaped; pods very narrow.

Var. b. A. angusta; narrow-leaved; branches and flower-stalks velvety; leaf-stumps line-like, awl-shaped; pods very narrow. *Mimosa verticillata*, L'Heritier.

Var. c. A. latifolia; broad-leaved; branches and flower-stalks velvety; leaf-stumps inversely egg-oblong; pods broader than the preceding varieties. *Mimosa ulicifolia*, Salisbury; *M. verticillata*, Wendland. Propagated by cuttings in sandy peat.

II.

CONJUGATELY-WINGED ACACIAS (*Conjugatæ-Pinnatæ*). EACH LEAF CONSISTING OF ONE PAIR OF LEAFITS, EACH LEAFIT (*pinna*) BEARING A FEW OR MANY PAIRS OF LEAFLETS.

A. reticulata. A. pulchella.

1. *Every leafit bearing less than* 10 *pairs of leaflets.*

97. Catkin Acacia (*A. amentacea*, Mocino and Sessé). An ornamental, evergreen, bark-stove tree from New Spain; smooth; thorns straight at the base of the leaves; leafit with two pairs of oblong leaflets; leaf-stalk very short; flowers yellow; spikes oblong, cylindrical, and without footstalks, very dense, resembling the catkin of a willow; propagated by seeds or cuttings in sandy peat —D. C. Sp. 65.

98. Cassian Acacia (*A. cassioides*, Willdenow). An ornamental, evergreen, bark-stove tree, with bristle-like thorns at the base of the leaves; leafits of four to six pairs of lance-shaped leaflets, acute at both ends; country, flower, and fruit unknown; propagated by seeds or cuttings in sandy peat.—D. C. Sp. 80.

99. Ash Grey Acacia (*H. cineraria*, Willdenow). An ornamental, evergreen bark-stove tree of the East Indies: prickles scattered and hooked; leafits with eight or nine pairs of oblong, line-like, equal leaflets; propagated by cuttings in sandy peat. *Mimosa cineraria*, Linnæus.—D. C. Sp. 78.

100. Coronillan Acacia (*A. coronillæfolia*, Desfontaines). An ornamental, evergreen, greenhouse tree, ten to twenty feet high, from Mogodor in 1817: smooth; leafits bearing five to nine pairs of line-like, blunt leaflets; leaf-stalks very short, with a gland between the pairs of leafits; heads of flowers egg-oblong, on stalks; propagated by cuttings in sandy peat and loam. *Mimosa Giraffe*, Broussonet; *M. coronillæfolia*, Persoon.—D. C. Sp. 68.

101. Detaining Acacia (*A. detinens*, Burchell). An ornamental, evergreen, greenhouse shrub, three feet high, from the Cape of Good Hope in 1824: thorns at the base of the leaves, bent back; leaflets inversely egg-oblong; leaf-stalks hairy; flowers, yellow, from April to June; pods oval and flat; propagated by cuttings in sandy peat.—D. C. Sp. 76.

102. Woolly-spiked Acacia (*A. eriantha*, Desvaux). An ornamental, evergreen, bark-stove tree, from the East Indies: leafits with about six pairs of nearly elliptic, hairy leaflets; calyx quite smooth; corolla with silky stiffish hairs on the outside; propagated by cuttings in sandy peat.

103. Flaccid Acacia (*A. flaccida*, Sprengel). An ornamental, evergreen, bark-stove shrub, from Brazil: branches and leaf-stalks long and thread-shaped, flaccid, smooth; each leafit with six pairs of oblong, ribbed, hairy leaflets; propagated by cuttings in sandy peat.—Spreng. Syst. 3, p. 137.

104. Gum-bearing Acacia (*A. gummifera*, Willdenow). An ornamental, evergreen, greenhouse tree, thirty feet high, from the north of Africa, near Mogodor, in 1823: smooth; leafits bearing six pairs of line-like, blunt, leaflets, with a gland between the pairs of leafits; spikes oblong; pod covered with white soft hair; propagated by cuttings in sandy peat. It is very like the *A. Arabica*. *Sassa gummifera*, Gmelin.

105. Purple-mouthed Acacia (*A. hæmastoma*, Bertolini). An ornamental, evergreen, hothouse shrub, four to six feet high, from St. Domingo: smooth; leafits with four to six pairs of egg-oblong, elliptic, blunt, leaflets, two lines long; leaf-stalk without a gland; small heads of flowers single or in pairs; stamens purple; propagated by cuttings in sandy peat. *Mimosa spartioides*, Vahl.—D. C. Sp. 75.

106. Most-hairy Acacia (*A. hispidissima*, De Candolle). An ornamental, evergreen, greenhouse shrub, four to six feet high, from New Holland in 1800: stem, branches, and leaf-stalks, covered with long, white, stiff hairs; winged, with five to seven pairs of oblong, blunt leaflets, which distinguish it from the *A. pulchella*; propagated by cuttings in sandy peat.—D. C. Sp. 74.

107. Lax-flowered Acacia (*A. laxiflora*, De Candolle). An ornamental, evergreen, bark-stove tree, from the island of Timor: smooth, without thorns; leafits with three pairs of oval leaflets, two to three inches long, and an inch and a half broad; flowers, with numerous stamens; propagated by cuttings in sandy peat.—D. C. Sp. 66.

108. Pretty Acacia (*A. pulchella*, R. Brown). An ornamental, evergreen, greenhouse shrub, three feet high, from New Holland: leafits bearing five to seven pairs of inversely egg-oblong, blunt leaflets; leaf-stalks short, with a gland on a foot-stalk between the pairs of leafits; flowers yellow, in solitary heads; propagated by cuttings in sandy peat. Probably the same as the *A. pulchella*, Link.—Bot. Cab. 212.

109. Netted Acacia (*A. reticulata*, Willdenow). An ornamental, evergreen, greenhouse tree, twelve feet high, from the Cape of Good Hope in 1816: leaves with one or more pairs of leafits, each bearing six to nine pairs of oblong, line-like, blunt, distant leaflets; a gland at the end of the leaf-stalk; spikes globose; flowers white; pod oval and flattish; propagated by cuttings in sandy peat. *Mimosa reticulata*, Linnæus.—D. C. Sp. 72.

110. Strigose Acacia (*A. strigosa*, Sprengel). An ornamental, evergreen, hothouse shrub, from Peru: leaves with

one pair of leafits, each bearing about two pairs of slanting leaflets hairy beneath; the heads of the flowers globose, and the pod covered with stiff bristly hairs; propagated by cuttings in sandy peat. *Mimosa strigosa*, Persoon.

111. Spiral-headed Acacia, (*A. strombulifera*, Willdenow). An ornamental, evergreen, hothouse shrub, eight feet high, from Peru in 1825: smooth; leafits bearing four or six pairs of alternate or opposite line-like, blunt leaflets; no gland between the leafits; pod not opening (*indehiscent*); propagated by cuttings in sandy peat. *Mimosa strombulifera*, Lamarck.—D. C. Sp. 69.

112. Green-branched Acacia (*A. viridiramis*, Burchell). An ornamental, evergreen, greenhouse shrub, four feet high, from the Cape of Good Hope in 1816: branches green, wavy; buds white with wool; leaf-scales bent back; leafits with six to eight pairs of small, oval, approximating leaflets; flowers yellow; propagated by cuttings in sandy peat.

2. *Every leafit bearing ten or more pairs of leaflets.*

113. Two-winged Acacia (*A. diptera*, Willdenow). An ornamental, evergreen, bark-stove tree, of South America, having very short, awl-shaped thorns at the base of the leaves; leafits bearing twenty to twenty-four pairs of line-like, blunt, smooth leaflets; propagated by cuttings in sandy peat.—D. C. Sp. 81.

114. Hoary Acacia (*A. incana*, Sprengel). An ornamental, evergreen, bark-stove shrub from Brazil, having its branches clothed with flocky down; each leafit having about twenty pairs of oblong, blunt, ribless leaflets, hoary, and covered with prominent dots beneath; propagated by cuttings in sandy peat.—Spreng. Syst. 3, p. 137.

115. Magdalena Acacia (*A. Magdalenæ*, Bertolini). An ornamental bark-stove tree of St. Martha: thornless; leafits bearing twenty-five pairs of line-like, blunt leaflets; leaf-stalk hairy, glandless; pod two inches long, the valves thick and furrowed on the outside; propagated by seeds or cuttings in sandy peat.—D. C. Sp. 70.

116. Pilose Acacia (*A. pilosa*, Bertolini). An ornamental, evergreen, bark-stove tree, thirty feet high, from Jamaica in 1800: thorns almost axillary; leaf-scales lance-shaped, streaked; leafits bearing thirteen pairs of blunt leaflets, leaf-stalk very short, glandless; branches covered with long hair-like thorns, and leaf-scales present at the same time; propagated by cuttings in sandy peat.—D. C. Sp. 71.

117. Salt-marsh Acacia (*A. Salinarum*, De Candolle). An ornamental, evergreen, bark-stove tree, from the salt-marshes of Jamaica: leafits with nineteen to twenty pairs of line-like, blunt leaflets; a gland at the top of the leaf-stalk, and one between each pair of leaflets; spikes single; stamens ten; seed-organ hairy; propagated by cuttings in sandy peat. *Mimosa salinarum*, Vahl.—D. C. Sp. 82.

118. Sillo's Acacia (*A. Selloi*, Sprengel). An ornamental, evergreen, bark-stove tree of Brazil: thornless; leaves without footstalks, each leafit with twelve pairs of line-like, shining leaflets; pods straight, lance-shaped, with thick margins; propagated by cuttings in sandy peat.

119. Setose Acacia (*A. setosa*, Sprengel). An ornamental, evergreen, bark-stove shrub of Brazil, with hairy branches: each leafit having many pairs of line-like leaflets, themselves fringed with stiff hairs on the margin; propagated by cuttings in sandy peat.—Spreng. Syst. 3, p. 137.

III.

SPIKE-FLOWERED ACACIAS (*Spicifloræ*). FLOWERS DISPOSED IN SPIKES.

1. A. modesta. 2. A. Senegal. 3. A. cornigera. 4. A. horrida. 5. A. muricata. 6. A. lophantha.

1. *Leaves doubly-winged, with few or many pairs of leafits, each leafit bearing many pairs of leaflets. Trees or shrubs without prickles or thorns.*

1. *Leaves with less than ten pairs of leafits.*

120. Acapulco Acacia (*A. Acapulcensis*, Kunth). An ornamental, evergreen, bark-stove shrub from Acapulco: leaves with eight to nine pairs of leafits, every leafit with thirty-five to forty-five pairs of oblong, line-like, smooth leaflets; leaf-stalks with glands; spikes cylindrical; flowers white; stamens numerous; propagated by cuttings in sandy peat.—Kunth, Mim., 78, T. 24.—D. C. Sp. 96.

121. Astringent Acacia (*A. adstringens*, Von Martius). An ornamental, evergreen, greenhouse shrub, two or three feet high, from Brazil: leaves with four to five pairs of leafits, every leafit having four to five pairs of broad, egg-oblong, greyish leaflets; leaf-stalks and young branches covered with

a chesnut-coloured cotton; propagated by cuttings in sandy peat.—Mart. Lin. 5, p. 41.

122. Sand Acacia (*A. arenosa*, Willdenow). An ornamental bark-stove shrub, ten feet high, from the Caraccas in 1818: leaves with six pairs of leafits, each leafit bearing sixteen pairs of line-like, acute, fringed leaflets; not glandless; spikes thread-like, in pairs; propagated by cuttings in sandy peat.—D. C. Sp. 91.

123. Callous-warted Acacia (*A. callosa*, Sprengel). An ornamental, evergreen, hothouse tree or shrub from Brazil, having its branches beset with callous-warts: leaf-stalks hairy, with a gland at the base; leaves with seven pairs of leafits, each leafit with many pairs of line-like, shining leaflets; spikes disposed in panicles: propagated by cuttings in sandy peat.—Spreng. Syst. 3, p. 138.

124. Tailed Acacia (*A. caudata*, De Candolle). An ornamental, evergreen, bark-stove tree from Cayenne: leaves with two to three pairs of leafits, each leafit supporting seven to eight pairs of line-like, oblong, very blunt, smooth leaflets; leaf-stalks glandless; spikes in pairs; stamens ten; petals five; propagated by cuttings in sandy peat. *Mimosa caudata*, Vahl.—D. C. Sp. 83.

125. Circle-seeded Acacia (*A. cyclosperma*, De Candolle). An ornamental, evergreen, greenhouse tree, a native of New Caledonia: leaves with three pairs of leafits, each leafit bearing three to four pairs of egg-oblong smooth leaflets; a gland between each of the pairs of leafits, and between each of the pairs of leaflets; spikes single; seeds circular and flat; propagated by cuttings in sandy peat.—D. C. Sp. 84.

126. Two-spiked Acacia (*A. distachya*, Mocino and Sessé). An ornamental, evergreen, bark-stove tree from New Spain: leaves with four pairs of leafits, each leafit with three to four pairs of oval, blunt, and rather hairy leaflets; spikes in pairs; propagated by cuttings in sandy peat.

127. Bush Acacia (*A. Dumetorum*, De Candolle). A native of Brazil: the stem with few prickles, branches furrowed, hairy; leaves two, with two leafits, each leafit bearing many pairs of minute leaflets, which are glandularly dotted beneath. *Mimosa Dumetorum*, St. Hilaire.

128. Shining Acacia (*A. fulgens*, Labillardiere). An ornamental, evergreen, greenhouse shrub, twelve feet high, from New Caledonia: leaves with two to three pairs of leafits, each leafit bearing three pairs of broad, elliptic, blunt leaflets; propagated by cuttings in sandy peat.—Lab. Cat., p. 68, T. 67.

129. Granular Acacia (*A. granulosa*, Labillardiere). An ornamental greenhouse shrub, from New Caledonia: leaves with five pairs of leafits, each leafit bearing twelve pairs of alternate, obliquely-egg-oblong, blunt leaflets; spikes single; propagated by cuttings in sandy peat.—Lab. Cat., p. 67, T. 66.

130. Thibaud's Acacia (*A. Thibaudiana*, De Candolle). An ornamental, evergreen, bark-stove tree, from South America: leaves with four pairs of leafits, each leafit with seven to nine pairs of egg-oblong and somewhat rhomboid leaflets; propagated by cuttings in sandy peat.—D. C. Sp. 86.

131. Lophanthan Acacia (*A. lophanthoïdes*, De Candolle). An ornamental, evergreen. bark-stove tree, from Jamaica in 1818: leaves with eight to nine pairs of leafits, each leafit with twelve pairs of oval-oblong, blunt leaflets; no glands; flowers in clusters, usually in pairs, short and axillary; calyx smooth; propagated by cuttings in sandy peat.

132. Naked-flowered Acacia (*A. nudiflora*, Willdenow). An ornamental, evergreen, bark-stove tree, twenty feet high, from Porto Rico: leaves downy beneath, with four to six pairs of leafits, each leafit bearing twelve to fifteen pairs of elliptic, blunt leaflets, with a depressed gland between every pair of the leafits.—D. C. Sp. 88.

133. Rohr's Acacia (*A. Rohriana*, De Candolle). An ornamental, evergreen, bark-stove tree, thirty feet high, from South America in 1823: leaves with four pairs of leafits, each leafit with about ten or eleven pairs of small leaflets, beset with yellow, velvet-like pile on the leaf-ribs, with a gland between each of the pairs of leaflets; propagated by cuttings in sandy peat. *Mimosa nigricans* of Vahl, but not of Labillardiere.—D. C. Sp. 87.

134. Beak-podded Acacia (*A. rostrata*, Humboldt). An ornamental, evergreen, bark-stove tree, from South America: leaves with six pairs of leafits, each leafit bearing many pairs of line-like, smooth leaflets; spikes axillary; propagated by cuttings in sandy peat. *Mimosa ignava*, Kunth.

135. Sprengel's Acacia (*A. Sprengelii*, G. Don). An ornamental, evergreen, bark-stove tree, from Jamaica: leaves with six pairs of leafits, every leafit with fifteen pairs of oblong, blunt, hairy leaflets; spikes in pairs, short; propagated by cuttings in sandy peat. *A. Berteriana*, Sprengel, in Syst., iii. 138, but not Sprengel, in Herb. Balb.—D. C.

136. Wallich's Acacia (*A. Wallichiana*). An ornamental, evergreen, bark-stove tree, thirty feet high, from the East Indies in 1820: branches and leaves hairy; leaves with ten to twelve pairs of leafits, every leafit having about fifty pairs of line-like leaflets; leaf-stalk with glands; spikes cylindrical; propagated by cuttings in sandy peat.

2. *Leaves with less or more than ten pairs of leafits.*

137. Crest-flowered Acacia (*A. lophantha*, Willdenow). An ornamental evergreen, greenhouse shrub, eight feet high, from New Holland in 1803: leaves with eight to ten pairs of leafits, each leafit with twenty-five to thirty pairs of line-like, bluntish leaflets; leaf-stalks not glandless; calyx downy; flowers from May to July; propagated by cuttings in sandy peat. *Mimosa distachya*, Ventenat, but not of Cavanilles; *M. elegans*, Andrews. Probably the *A. insignis* of Hoffmansegg is not distinct from the present species.

138. Smooth-spiked Acacia (*A. psylostachya*, De Candolle). An ornamental, evergreen, bark-stove tree, from French Guiana: leaves with seven to ten pairs of leafits, every leafit with fifteen to twenty pairs of oblong, line-like, blunt, smooth leaflets; leaf-stalks not glandless; spikes single; flowers white, small, and hairy; propagated by cuttings in sandy peat—D. C. Sp. 95..

3. *Leaves with ten or more pairs of leafits.*

139. Aspidian Acacia (*A. aspidioides*, Meyer). A tree, forty or fifty feet high, found in moist places in the island of Arowabisch, in Guiana: leaves with fifteen to eighteen pairs of leafits, every leafit having many pairs of line-like, smooth leaflets, each bearing on its under surface at the base a transverse gland; spikes cylindrical, in terminal clusters.—D. C. Sp. 102.

140. Whitened Acacia (*A. dealbata*, Link). An ornamental, evergreen, bark-stove tree, native country unknown: leaves with fifteen pairs of leafits, every leafit bearing many pairs of minute, equal, hairy leaflets, with a perforated gland between one of the pairs of leafits; spikes in clusters at the sides; propagated by cuttings in sandy peat.—D. C. Sp. 103.

141. Elephant-root Acacia (*A. elephanthorhiza*, Burchell). A greenhouse tree, from the Cape of Good Hope in 1818: leaves with ten to twelve pairs of leafits, every leafit with twenty-five pairs of line-like, smooth leaflets; leaf-stalks without glands; spikes cylindrical, single; petals sixteen; stamens ten; propagated by cuttings in sandy peat. Probably a species of *Prosopis*.—D. C. Sp. 97.

142. Guiana Acacia (*A. Guianensis*, Willdenow). An ornamental, evergreen, bark-stove tree, forty feet high, from Guiana and Cayenne in 1803: leaves with ten pairs of leafits, every leafit having ten pairs of elliptic, blunt, smooth leaflets; leaf-stalk rather velvety, not glandless; spikes thread-like, single; flowers white, small and smooth. *Mimosa Guianensis*, Aublet.—D. C. Sp. 101.

143. Long-podded Acacia (*A. macroloba*, Willdenow). A tree, forty or fifty feet high, from Para in Brazil: leaves with sixteen pairs of leafits, every leafit with many pairs of line-like, sickle-shaped leaflets, angular at the base; leaf-stalks with two hairy lines on the upper side.

144. Thorny Acacia (*A. muricata*, Willdenow). A

tree of the West Indies: leaves with five pairs of leafits, each leafit with twelve to fifteen pairs of egg-oblong, abruptly blunt leaflets, with a depressed gland between each of the pairs of leafits; spikes cylindrical; flowers white; branches warty. *Mimosa muricata*, Linnæus.—D. C. Sp. 89.

145. Fairest Acacia (*A. pulcherrima*, Willdenow). An ornamental, evergreen, bark-stove tree, forty to fifty feet high, from Para, in Brazil, in 1823: leaves with twelve pairs of leafits, every leafit bearing numerous pairs of oblong, line-like, blunt leaflets, hairy beneath; flowers hairy, five-cleft; propagated by cuttings in sandy peat.—D. C. Sp. 99.

146. Hard-wooded Acacia (*A. scleroxyla*, Tussac). A tree, sixty feet high, from the French West India islands in 1822: leaves with ten to fifteen pairs of leafits, every leafit with an indefinite number of leaflets, with a pitcher-shaped gland below the lower pairs of leafits; spikes thread-like, single; branches warty.—Tuss. Fl. Ant., T. 21.

2. *Leaves doubly-winged, with few or many pairs of leafits, each leafit bearing many pairs of leaflets. Trees and shrubs furnished with prickles or thorns.*

1. *Leaves with less than ten pairs of leafits.*

147. Adiantum-like Acacia (*A. adiantoides*, Sprengel). A tree of Brazil: prickles, short, few, straight; leaves with four pairs of leafits, every leafit bearing about eight pairs of alternate, blunt, shining leaflets; spikes axillary, and without foot-stalks.—Spreng. Syst. 3, p. 146.

148. White-leaved Acacia (*A. albida*, Delile). An ornamental, greenhouse tree, twenty feet high, from Upper Egypt: prickles at the base of the leaves, straight; leaves with three to four pairs of leafits, every leafit with nine to ten pairs of oblong, line-like, blunt, smooth leaflets; a gland without a foot-stalk, between each of the pairs of leafits; spikes cylindrical; propagated by cuttings in sandy peat.—D. C. Sp. 118.

149. Asak Acacia (*A. Asak*, Willdenow). An ornamental, evergreen, bark-stove tree, from Arabia Felix, where it is called *Asak:* thorns at the base of the leaves, three together(?); leaves with three pairs of leafits, every leafit having five pairs of leaflets; a gland, on a foot-stalk, between the lower pair of leaflets; propagated by cuttings in sandy peat. *Mimosa Asak*, Forskal.—D. C. 125.

150. Irregular-thorned Acacia (*A. ataxacantha*, De Candolle). An ornamental, evergreen, hothouse shrub, from the banks of the rivers Gambia and Senegal: prickles hooked, and scattered in an irregular manner along the branches and leaf-stalks; leaves with six to eight pairs of leafits, every leafit having twenty to thirty pairs of line-like, fringed leaflets; leaf-stalks furnished with glands; spikes in pairs, cylindrical; twenty to twenty-five stamens; propagated by cuttings in sandy peat.—D. C. Sp. 115.

151. Caducous Acacia (*A.? caduca*, Humboldt). A tree of Peru: prickles scattered; leaves with four to six pairs of leafits, every leafit having five to ten pairs of slanting, oval, blunt leaflets, hairy beneath; leaf-stalks without any gland; spikes axillary; eight to ten stamens.

152. Ox-horn Acacia, or Cuckold Tree (*A.? cornigera*, Willdenow). An ornamental, evergreen, bark-stove tree, ten to fifteen feet high, from South America in 1692: prickles or thorns at the base of the leaves, and joined together at the base, so as to resemble the horns of an ox; leaves with six pairs of leafits, every leafit having about twenty pairs of smooth leaflets; spikes cylindrical; flowers pale yellow; propagated by cuttings in sandy peat. *Mimosa cornigera*, Linnæus.—D. C. Sp. 122.

Var. a. American (*A. Americana*, De Candolle). A native of Mexico, Cuba, and in the woods of Carthagena. Spines brown.

Var. b. Indian (*A. Indica*, De Candolle). A native of the East Indies. Spines yellow.—Seba. Thes., i. T. 70, f. 13.

153. Dalea-like Acacia (*A. Dalea*, Desvaux). An ornamental, evergreen tree, from the East Indies: thorns straight, single, at the base of the leaves, hairy; leaves with two pairs of leafits, hairy; spikes three together on short stalks; flowers rose-coloured; propagated by cuttings in sandy peat.

154. Rusty Acacia (*A. ferruginea*, De Candolle). An ornamental, evergreen, bark-stove tree, twenty feet high, from Coromandel in 1818, resembling *A. sundra* and *A. Catechu:* thorns at the base of the leaves, conical; leaves with three to four pairs of leafits, every leafit with ten to twelve pairs of line-like, smooth leaflets; a large depressed gland on the foot-stalk; spikes cylindrical, in a panicle; pod oval, one to two-seeded; propagated by cuttings in sandy peat. *Mimosa ferruginea*, Roxburgh.—D. C. Sp. 105.

155. Hostile Acacia (*A. hostilis*, Von Martius). An ornamental, evergreen, hothouse shrub, from Brazil: prickles straight, scattered; leaves with four to six pairs of leafits, each leafit having twenty pairs of line-like leaflets; leaves covered with clammy down; spikes single; pod line-like, oblong, two to three-seeded; propagated by cuttings in sandy peat.—Mart. Reis Bras. ex Schlecht.

156. Plunderer's Acacia (*A. Latronum*, Willdenow). An ornamental, evergreen, hothouse shrub, six feet high, from the East Indies in 1820: thorns milk-coloured, straight, at the base of the leaves, in pairs which are joined together at the base; leaves with four pairs of leafits, every leafit having many pairs of small leaflets; spikes generally in pairs, axillary; flowers white; pod half-moon shaped; propagated by cuttings in sandy peat. *Mimosa Latronum*, Linnæus.

157. Modest Acacia (*A. modesta*, Wallich). An ornamental, evergreen, hothouse shrub, ten feet high, from Hindostan: thorns at the base of the leaves, in pairs, awl-shaped; leaves with two or three pairs of leafits, every leafit having four pairs of oblong, blunt leaflets; leaf-stalks hairy, with a gland in the middle; spikes nodding, usually single, terminal, and axillary; flowers, in April, white, fragrant; pod six-seeded; propagated by cuttings in sandy peat.—Wall. Pl. Rar. Asiat., ii. 27, T. 130.

158. One-spined Acacia (*A. monacantha*, Willdenow). An ornamental, evergreen, bark-stove tree, twenty feet high, from Brazil in 1818: prickles at the base of the leaves, single, bent back; leaves commonly with eight pairs of leafits, every leafit having seventeen to twenty pairs of oblong leaflets; spikes cylindrical, panicled; propagated by cuttings in sandy peat.—D. C. Sp. 119.

159. Prosopoian Acacia (*A. prosopoides*, Mocino and Sessé). An ornamental, evergreen, bark-stove tree, from New Spain: prickles few, scattered, hooked at the tip; leaves with two or three pairs of leafits, every leafit having two to three pairs of oval, oblong, blunt, smooth leaflets; spikes generally in pairs; corolla reddish, five-cleft; propagated by cuttings in sandy peat.—D. C. Sp. 127.

160. Senegal Acacia (*A. Senegal*, Willdenow). An ornamental, evergreen, bark-stove tree, twenty feet high, from Arabia and the interior of Africa in 1823: branches white, smooth; prickles at the base of the leaves, straight, short, sometimes none; leaves with five to eight pairs of leafits, every leafit with fifteen to eighteen pairs of oblong, line-like, blunt, smooth leaflets; a gland, without a foot-stalk, between each of the pairs of leafits; spikes single, slender, axillary; flowers white, small, distant; propagated by cuttings in sandy peat. *Mimosa Senegal*, Linnæus.—D. C. Sp. 117.

161. Spini's Acacia (*A. Spini*, Balbis). An ornamental, evergreen, bark-stove tree, fifteen feet high, native country unknown: prickles at the base of the leaves, single, hooked; leaves with three to four pairs of leafits, every leafit having three to five pairs of elliptic leaflets; spikes cylindrical, single, or in pairs; flowers greenish yellow; propagated by cuttings in sandy peat.

162. Subtile-leaved Acacia (*A. subtilifolia*, Humboldt). A tree of New Granada: thorns at the base of the leaves, almost upright; leaves with five to ten pairs of leafits, every

leafit with thirty to forty-five pairs of line-like leaflets, which are covered with spreading down beneath; leaf-stalks with two glands; spikes cylindrical, single; pod oblong, and without prickles.—D. C. Sp. 108.

163. Fine-flowered Acacia (*A. tenuiflora*, Willdenow). A tree of the Caraccas: prickles scattered, bent inwards; leaves with five pairs of leafits, every leafit having many pairs of fringed leaflets; leaf-stalks somewhat prickly; spikes thread-like; pod three to five-seeded.—D. C. Sp. 123.

2. *Leaves with less or more than ten pairs of leafits.*

164. Caffrarian Acacia (*A. Caffra*, Willdenow). An ornamental, evergreen, greenhouse tree, twelve to twenty feet high, from the Cape of Good Hope in 1800: prickles in pairs, at the base of the leaves, bent inwards; five to ten pairs of leafits, each leafit with twenty to thirty pairs of spear-shaped, line-like, blunt, smooth leaflets; a depressed gland at the base of the leaf-stalk; pods line-like, spear-shaped; propagated by cuttings in sandy peat. *Mimosa Caffra*, Thunberg.—D. C. Sp. 111.

165. Green-flowered Acacia (*A. viridiflora*, Kunth). An ornamental, evergreen, bark-stove tree, twenty feet high, from South America in 1823: prickles bent back; leafits six to fifteen pairs, each leafit with fifteen to thirty-five pairs of line-like, oblong leaflets; leaf-stalks and leaflets covered with spreading down beneath; one gland at the base of each leaf-stalk, and two or three along the common foot-stalk; spikes cylindrical, single; flowers greenish-white, five-cleft; propagated by cuttings in sandy peat.—Kunth, Mim. 81, T. 25.—D. C. Sp. 110.

3. *Leaves with ten or more pairs of leafits.*

166. Catechu Tree (*A. Catechu*, Willdenow). An ornamental, evergreen, bark-stove tree, thirty to forty feet high, from the East Indies in 1790: prickles at the base of the leaves, straight when young, afterwards hooked; leaves with ten pairs of leafits, every leafit with forty to fifty pairs of line-like, hairy leaflets; one depressed gland at the base of the leaf-stalk, and two or three between the extreme pairs of leafits; spikes cylindrical; flowers yellow, five-cleft; pod lance-shaped, flat, three to six-seeded; propagated by cuttings in sandy peat. *Mimosa Catechu*, Roxburgh.

167. Fascicled Acacia (*A. fasciculata*, Kunth). An ornamental, evergreen, bark-stove tree, from Mexico: prickles straight, in pairs or scattered; leaves with fifteen pairs of leafits, every leafit having nine to fourteen pairs of obliquely oblong leaflets; leaf-stalk hairy, without a gland; spikes fasciculately panicled; flowers white, five-cleft; propagated by cuttings in sandy peat.—Kunth. Mim. 75, T. 23.

168. Long-spiked Acacia (*A. macrostachya*, Reichenbach). An ornamental, evergreen, bark-stove shrub, ten feet high, from Senegal and Gambia: prickles hooked, and irregularly scattered; leaves with twenty pairs of leafits, every leafit with twenty to thirty pairs of line-like, velvety, and fringed leaflets; spikes of flowers covered with hoary cotton, three inches long; leaf-stalks and branches velvety; propagated by cuttings in sandy peat.—Reich. in Sieb. Pl. Exsic. Seneg. No. 44.—D. C. Sp. 116.

169. Many-thorned Acacia (*A. polyacantha*, Willdenow). An ornamental, evergreen, bark-stove tree, from the East Indies: prickles at the base of the leaves, dilated; leaves with ten pairs of leafits, every leafit with thirty to forty pairs of line-like, blunt, fringed leaflets; leaf-stalks with glands; spikes cylindrical, in pairs; propagated by cuttings in sandy peat. *Mimosa spinosissima*, Poiret.

170. Starry Acacia (*A. stellata*, Willdenow). An ornamental, evergreen, greenhouse tree, from Mount Kurma in Arabia Felix: leaves with ten pairs of leafits, every leafit with thirteen pairs of oblong leaflets; leaf-stalks having two or three bent-back prickles at the origin of each leafit; flowers in compound clusters; petals five; pod spear-shaped, flattish, membranous; propagated by cuttings in sandy peat. *Mimosa stellata*, Forskal.—D. C. Sp. 113.

171. Sundra Acacia (*A. Sundra*, De Candolle). An ornamental, evergreen, bark-stove tree, fifteen feet high, from the coast of Coromandel in 1789: thorns at the base of the leaves, hooked; leaves with about twenty pairs of leafits, every leafit having about twenty pairs of line-like, smooth leaflets; leaf-stalks with glands; spikes cylindrical, generally single; flowers yellow; pod flat, two to three-seeded, tapering at each end; propagated by cuttings in sandy peat. *Mimosa Sundra*, Roxburgh; *Acacia Chundra*, Willdenow.—D. C. Sp. 106.

172. Velvety Acacia (*A. velutina*, De Candolle). An ornamental, evergreen, bark-stove tree, from Brazil: leaves with eleven pairs of leafits, each leafit having twenty-five to thirty pairs of oblong, line-like, hairy leaflets; leaf-stalks hairy, furnished with hooked prickles and glands; flowers and flower-stalks hairy; corolla five-furrowed; propagated by cuttings in sandy peat.—D. C. Sp. 114.

IV.

GLOBE ACACIAS (*Globifloræ*). FLOWERS COLLECTED INTO GLOBOSE HEADS AT THE TOP OF THE FLOWER-STALKS. LEAVES DOUBLY-WINGED, WITH FEW OR MANY PAIRS OF LEAFITS, EACH LEAFIT BEARING FEW OR MANY LEAFLETS.

1. A. Lambertina. 2. A. nigricans. 3. A. Houstoni. 4. A. discolor. 5. A. pubescens. 6. A. quadrangularis.

A. ACULEATE (*furnished with prickles*): *All the prickles at the base of the leaves, and straight; pods without prickles; stamens twenty or more.*

1. *Leaves with less than ten pairs of leafits.*

173. Whitish Acacia (*A. albicans*, Kunth). A tree from Mexico, on the sea-shore near Campeachy: thorns in pairs; leaves with eight to nine pairs of leafits, every leafit having nineteen to thirty-two pairs of leaflets; flowers white, with numerous stamens, in heads two to five, aggregate, rising in axillary clusters.—Kunth. Mim. 87, T. 27.—D. C. Sp. 111.

174. Arabian Acacia, or Gum Thur Tree (*A. Arabica*, Willdenow). An ornamental, evergreen, bark-stove tree, thirty to forty feet high, from the East Indies, Senegal, Egypt, and Arabia in 1820: thorns in pairs; branches and leaf-stalks downy; leaves with four to six pairs of leafits, every leafit having ten to twenty pairs of oblong, line-like leaflets; flowers yellow, on foot-stalks, usually three heads together; pod resembling a string of beads; propagated by cuttings in sandy peat. *Mimosa Arabica*, Lamarck; *A. Nilotica*, Delile.—D. C. Sp. 135.

175. Burmann's Acacia (*A. Burmanniana*, De Candolle). An ornamental, evergreen, bark-stove shrub, six feet high, from the East Indies in 1818: thorns in pairs, smooth; leaves with six pairs of leafits, every leafit having fifteen to twenty pairs of leaflets; leaf-stalks glandular and downy; heads of flowers single; propagated by cuttings in sandy peat. *Mimosa tortuosa*, Burmann.—D. C. Sp. 123.

Var. a. Flower-stalks three together, axillary. *Mimosa cæsia*, Burmann, but not of Linnæus.

176. Ivory-thorned Acacia (*A. eburnea*, Willdenow). An ornamental, evergreen, bark-stove shrub, six feet high, from the East Indies in 1792: thorns white, one to two inches long, in pairs, united at the base, smooth; the leaves, with four to eight pairs of leafits, each leafit having six to twelve pairs of oblong, small leaflets; a gland on the leaf-stalk between the lower pair of leafits; flowers yellow, with numerous stamens, crowded; pod seeded; propagated by cuttings in sandy peat.—D. C. Sp. 131.

177. Farnesian Acacia (*A. Farnesiana*, Willdenow). An ornamental, evergreen, bark-stove shrub, eight feet high, from St. Domingo: thorns twin; leaves with five to eight pairs of leafits, every leafit having from fifteen to twenty pairs of leaflets; glands on the leaf-stalks; and usually the heads are in pairs; propagated by cuttings in sandy peat. *Mimosa Farnesiana*, Linnæus; *Mimosa scorpioides*, Forskal.—D. C. Sp. 138.

Var. a. A. pedunculata, Willdenow. A native of Java and Timor, distinguished by the flower-stalks being a little longer.

Var. b. A. curvispina, De Candolle: thorns somewhat bent inwards; leaves with two pairs of leafits, bearing egg-oblong leaflets; probably a distinct species. *A. Farnesiana*, Hort. Rip.

178. Young-branched Acacia (*A. hebeclada*, De Candolle). An ornamental, evergreen, greenhouse shrub, six feet high, from the South of Africa in 1816: thorns in pairs; branches, leaf-stalks, and flower-stalks downy, and somewhat hairy; leaves with three to five pairs of leafits, every leafit having ten pairs of leaflets; heads of flowers scentless, on foot-stalks, two to three together; propagated by cuttings in sandy peat. *Acacia stolonifera*, Burchell.

179. Horrid Acacia (*A. horrida*, Willdenow). An ornamental, evergreen, bark-stove shrub, six feet high, from Africa and Arabia in 1823: thorns in pairs; leaves with two to three pairs of leafits, each leafit having nine to twelve pairs of oblong, blunt leaflets; two glands on the rib; flowers yellow, with numerous stamens; propagated by cuttings in sandy peat. *Mimosa horrida*, Linnæus; *M. leucacantha*, Jacquin; *M. eburnea*, Lamarck; *M. Orfota*, Forskal; *M. Capensis*, Burmann, Plunkenet; *Acacia Capensis*, Burchell.—D. C. Sp. 130.

Var. a., one to three glands on the leaf-stalks, either beneath or between the pairs of leafits.

180. Moorish Acacia (*A. Mauroceana*, De Candolle). An ornamental, evergreen, greenhouse shrub, four to six feet high, from Morocco in 1823: thorns in pairs; branches, leaf-stalk, and flower-stalks downy; leaves with three to eight pairs of leafits, every leafit with 10 to 20 pairs of oblong, line-like, leaflets; flowers white, in single heads, or two to three together; propagated by cuttings in sandy peat. *Mimosa Mauroceana*, Desfontaines.—D. C. Sp. 137.

181. Shining-leaved Acacia (*A. nitida*, Willdenow). A tree from the East Indies: thorns in pairs; leaves with two pairs of leafits, every leafit having five pairs of oblong leaflets, shining on their upper surface; a gland between each of the pairs of leafits: leaf-stalks downy. *Mimosa nitida*, Vahl.

182. Small-leaved Acacia (*A. parvifolia*, Willdenow). A tree from the East Indies, twenty feet high: thorns smooth; leaves with five to nine pairs of leafits, every leafit having ten to twenty pairs of small line-like leaflets; heads of flowers white and green, scentless, single. *Mimosa parvifolia*, Swartz; *M. Antillarum*, Poiret; *M. Mangensis*, Jacquin.—D. C. Sp. 139.

183. Sejal Acacia (*A. Seyal*, Delile). An ornamental, overgreen, bark-stove shrub, from Egypt: thorns in pairs; leaves with two pairs of leafits, each bearing 8 to 12 pairs of oblong, line-like, smooth leaflets; pod flattish, line-like, sickle-like, acute, smooth; propagated by cuttings in sandy peat. *Mimosa Sejal*, Forskal.—D. C. Sp. 129.

184. Twisted Acacia (*A. tortuosa*, Willdenow). An ornamental, evergreen, bark-stove tree, six feet high, from Jamaica and the island of St. Thomas in 1824: thorns half an inch long, in pairs, united at the base, downy; leaves with two to six pairs of leaflets, every leafit having twelve to sixteen pairs of leaflets; flowers, in single heads, yellow; pods with fleshy, juicy valves; propagated by cuttings in sandy peat. *Mimosa tortuosa*, Linnæus, but not of Burmann.

185. True, or Egyptian Thorn Acacia (*A. vera*, Willdenow). An ornamental, evergreen, bark-stove tree, twenty feet high, from Senegal and Egypt in 1596: thorns red, in pairs; branches and leaves smooth; leaves with two pairs of leafits, each leafit having eight to ten pairs of oblong, line-like leaflets; a gland between each pair of leaflets; flowers, yellow, generally in twin heads; pods resembling a string of beads; propagated by cuttings in sandy peat. *Mimosa Nilotica*, Linnæus; *Gommier rouge*, Adanson.

2. *Leaves with less or more than ten pairs of leafits.*

186. White Acacia (*A. alba*, Willdenow). An ornamental, evergreen, bark-stove tree, twenty feet high, from the East Indies: thorns at the base of the leaves; leaves with seven to ten pairs of leafits, every leafit having sixteen to twenty pairs of leaflets; heads of flowers panicled; propagated by cuttings in sandy peat. *Mimosa alba*, Roxburgh.

187. Twisted-spined Acacia (*A. cochliacantha*, Humboldt). A shrub, eight feet high, from Peru, near Guayaquil: thorns in pairs; leaves with nine to ten pairs of leafits, every leafit having nineteen to twenty-four pairs of line-like, very minute, fringed leaflets; four glands on the stems of the leaves; flowers white, with numerous stamens, in axillary heads.—D. C. Sp. 143.

188. Bloody-wooded Acacia (*A. Hæmatoxylon*, Willdenow). An ornamental, evergreen, greenhouse shrub, from the Cape of Good Hope in 1816: thorns in pairs; branchlets, leaves, and flower-stalks covered with hairy, velvety down; leaves with eight to sixteen pairs of leafits, each leafit having eighteen to twenty-four pairs of leaflets, which are so very minute, and so much crowded, as to appear joined together; propagated by cuttings in sandy peat. *A. atomiphylla*, Burchell.—D. C. Sp. 144.

189. White-juiced Acacia (*A. leucophlæa*, Roxburgh). A tree from the dry mountains of Coromandel: thorns in pairs; leaves with eight to twelve pairs of leafits, every leafit

having twenty to thirty pairs of leaflets; flowers pale yellow, with numerous stamens, clustered, the clusters in a terminal panicle. Willdenow's specimen had the branches and leaf-stalks covered with spreading down, and the leaflets somewhat fringed.—Roxb., Cor. ii. T. 150.—D. C. Sp. 142.

190. Dotted Acacia (*A. punctata*, Humboldt). An ornamental, evergreen, bark-stove tree, from South America: thorns in pairs; leaves with eight to twelve pairs of leafits, every leafit having about twenty-five to thirty pairs of line-like, blunt, fringed leaflets; a pitcher-shaped gland at the base of the leaf-stalk; propagated by cuttings in sandy peat. *Mimosa atomaria*, Poiret.—D. C. Sp. 147.

3. *Leaves with ten or more pairs of leafits.*

191. Flexuose Acacia (*A. flexuosa*, Humboldt). An ornamental, evergreen, bark-stove tree, from South America, near Cumana: thorns in pairs, united at the base, brown, shining; leaves with sixteen pairs of leafits, every leafit having twenty-five pairs of fringed leaflets; a depressed gland above the base of the leaf-stalks, and one between the last pair of leaflets; heads of flowers three to six together; propagated by cuttings in sandy peat.—D. C. Sp. 151.

Var. A. ambigua. A native of Guadaloupe: spines three lines long; flower-stalks five to six lines long; pod smooth.

192. Indian Acacia (*A. Indica*, Desvaux). An ornamental, evergreen, bark-stove tree, twenty feet high, from the East Indies in 1800: thorns in pairs; leaves with two to fifteen pairs of leafits, every leafit having fifteen to eighteen pairs of oblong, line-like, blunt leaflets; propagated by cuttings in sandy peat. *Mimosa Indica.*—D. C. Sp. 146.

193. Long-spined Acacia (*A. macracantha*, Humboldt). An ornamental, evergreen, bark-stove tree, from Peru, near Guayaquil: thorns in pairs, very long; leaves with fourteen to eighteen pairs of leafits, every leafit having thirty pairs of oblong, line-like, fringed leaflets; a gland at the base of the leaf-stalk; two or three glands between the pairs of leaflets; flowers yellow, in axillary heads, which are two to eight together; propagated by cuttings in sandy peat.

194. Macranthan Acacia (*A. macranthoides*, Bertolini). An ornamental, evergreen, bark-stove tree, twenty feet high, from Jamaica in 1820, very like the *A. macracantha:* leaves with twelve to fourteen pairs of leafits, every leafit having about twenty-five pairs of oblong, line-like, smooth leaflets.—D. C. Sp. 149.

195. Blunt-podded Acacia (*A. obtusa*, Humboldt). A tree from the Caraccas, on the banks of the Orinoco: thorns in pairs; leaves with sixteen to twenty pairs of line-like, smooth, fringed leaflets; pod line-like, arched, blunt and smooth.—D. C. Sp. 152.

196. Sieber's Acacia (*A. Sieberiana*, De Candolle). A tree from Senegal: thorns in pairs, white; leaves with fifteen to twenty pairs of leafits, every leafit having twenty-five to thirty pairs of elliptic, oblong, blunt, and somewhat fringed leaflets; heads of flowers in pairs; flower-stalks downy, twice the length of the heads; both flower-stalks and leaf-stalks covered with spreading down.—D. C. Sp. 151.

197. Sub-thornless Acacia (*A. subinermis*, Bertolini). An ornamental, evergreen, bark-stove tree, from Jamaica: thorns in pairs, short, awl-shaped, not always present; branches, leaf-stalks, and flower-stalks downy; leaves with thirty to forty pairs of leafits; flowers yellow, in axillary heads; two to three heads together; pod six to seven-seeded; propagated by cuttings in sandy peat.—D. C. Sp. 153.

198. Woolly Acacia (*A. tomentosa*, Willdenow). An ornamental, evergreen, bark-stove tree, fifteen to twenty feet high, from the East Indies in 1816: thorns in pairs; branches, flower-stalks, leaf-stalks, and under-surface of the leaves cottony; leaves with ten pairs of leafits, every leafit having twenty pairs of line-like, blunt leaflets; propagated by cuttings in sandy peat. *Mimosa Kleinii*, Poiret: probably the same as *Mimosa cavaty-tooma*, Roxburgh; *M. tomentosa*, Rottler.—D. C. Sp. 145.

The prickles at the base of the leaves; usually also on the leaf-stalks, and along the ribs of the pod; ten stamens.

199. Thorn-fruited Acacia (*A. acanthocarpa*, Willdenow). An ornamental, evergreen, hothouse shrub, ten feet high, from New Spain in 1822: prickles hooked; leaves sensible to the touch, with six to eight pairs of leafits, every leafit having six to fifteen pairs of oblong, downy leaflets; flowers dirty white, or flesh-coloured, on axillary twin heads; pod with prickles on the rib on both sides; propagated by cuttings in sandy peat. *Mimosa aculeaticarpa*, Ortega; *Acacia aculeaticarpa*, Lagasca.—D. C. Sp. 154.

Var. a. A. uncinella, De Candolle: leaf-stalks without prickles, with one gland at the base. *Mimosa Uncinella*, Poiret.

200. Cavenian Acacia (*A. Cavenia*, Hooker). An ornamental, evergreen, greenhouse tree, twenty feet high, from Chili: thorns straight; leaves commonly having five pairs of leafits, each leafit supporting nine to ten pairs of line-like, oblong leaflets, beset with rough hairs; leaf-stalks with one obscure gland; flowers polyandrous; propagated by cuttings in sandy peat. *Mimosa Cavenia*, Molina.—Hook. in Beech. Voy., Append. Bot. p. 21.

201. St. Domingo Acacia (*A. Domingensis*, Bertolini). An ornamental, evergreen, hothouse tree, from St. Domingo: thorns hooked, not always present; leaf-stalks prickly, glandless; leaves with four pairs of leafits, every leafit having seven pairs of elliptic, oblong, smooth leaflets; flowers white; pod without prickles; propagated by cuttings in sandy peat.

202. Revolute Acacia (*A. revoluta*, Kunth). An ornamental, evergreen, hothouse shrub, four to six feet high, from Peru: thorns straight; leaf-stalks without prickles; leaves with two to three pairs of leafits, each leafit having eight to twelve pairs of oblong leaflets; flowers white, in axillary heads, two or three together; pod prickly on the outer or convex joining; propagated by cuttings in sandy peat.—Kunth, Mim., 84, T. 26.—D. C. Sp. 153.

The prickles on the branches scattered without any order; stems erect.

1. *Leaves with less than ten pairs of leafits.*

203. Thorny-podded Acacia (*A. acantholoba*, Humboldt). An ornamental, evergreen, hothouse tree, ten to twenty feet high, from South America in 1823: prickles hooked; leaves with three to four pairs of leafits, every leafit having ten to twelve pairs of leaflets, downy beneath; flowers pale rose-coloured, in clustering heads, almost without foot-stalks; pod with prickles on both margins; propagated by cuttings in sandy peat —D. C. Sp. 157.

204. Grey Acacia (*A. cæsia*, Willdenow). An ornamental, evergreen, hothouse tree, twenty feet high, from the East Indies in 1773: prickles bent back; leaves with five to seven pairs of leafits, every leafit having twelve to sixteen pairs of oval spear-shaped leaflets; an oblong gland above the base of the leaf-stalk; flowers yellow, in terminal panicled heads; propagated by cuttings in sandy peat. *Mimosa cæsia*, Linnæus, not Burmann.—D. C. Sp. 166.

205. Spur-leaved Acacia (*A. centrophylla*, De Candolle). An ornamental, evergreen, hot-house tree, twenty feet high, from Jamaica in 1808: prickles numerous, bent back; leaves with six to nine pairs of leafits, every leafit having eight to twelve pairs of oblong, line-like, smooth, sharp-pointed leaflets; leaf-stalks without any glands, bearing awl-shaped prickles between the pairs of leafits; flowers white, in terminal clusters; propagated by cuttings in sandy peat.

206. Soap-wort Acacia (*A? concinna*, De Candolle). An ornamental, evergreen, hothouse tree, twenty feet high, from

the East Indies in 1823: branches velvety; leaves with five to six pairs of leafits, every leafit having many pairs of fringed leaflets; leaf-stalk prickly, one gland at its base; leaf-scales heart-shaped; heads of flowers in a terminal panicle; propagated by cuttings in sandy peat. *Mimosa saponaria*, Roxburgh; *M. concinna*, Willdenow.

207. Guadaloupe Acacia (*A. Guadalupensis*, De Candolle). An ornamental, evergreen, hothouse tree of Guadaloupe: prickles very few, bent back; leaves with seven to nine pairs of leafits, every leafit having fifteen to twenty pairs of oblong, line-like, smooth leaflets; no gland on the leaf-stalk; flowers yellow, with many stamens; pods flat, smooth, on short foot-stalks, three to four inches long, nine lines broad; propagated by cuttings in sandy peat.

208. Intsian Acacia (*A. Intsia*, Willdenow). An ornamental, evergreen, bark-stove tree, twenty feet high, from the East Indies in 1778: prickles bent back; leaves with six pairs of leafits, every leafit having about twelve pairs of leaflets bent inwards; a gland between the lower pairs of leaflets; propagated by cuttings in sandy peat. *Mimosa Intsia*, Linnæus.—D. C. 162.

209. Scurvy-branched Acacia (*A. Psoratea*, De Candolle). An ornamental, evergreen, hothouse shrub of Madagascar: leaves with two to five pairs of leafits, every leafit having about seven to eight pairs of smooth, oblong, line-like leaflets; leaf-stalks and flower-stalks beset with brown warts; heads of flowers single, axillary, and on foot-stalks; propagated by cuttings in sandy peat.—D. C. Sp. 158.

210. Streaked Acacia (*A. striata*, Humboldt). An ornamental, evergreen, hothouse tree of South America: prickles erect; leaves with nine pairs of leafits, every leafit having thirteen to sixteen pairs of leaflets; branches streaked, downy; leaf-stalks downy; heads of flowers small, in a terminal cluster; propagated by cuttings in sandy peat.

211. Tamarind-leaved Acacia (*A. tamarindifolia*, Willdenow). An ornamental, evergreen, hothouse tree, forty feet high, from the West Indies and South America in 1774: prickles on the branches straight; leaves with four to six pairs of leafits, every leafit having ten to fifteen pairs of oblong, smooth leaflets; leaf-stalk rather prickly, one gland at its base; leaf-scales heart-shaped; flowers white, in panicled heads; propagated by cuttings in sandy peat. *Mimosa tamarindifolia*, Linnæus.—D. C. Sp. 160.

212. West's Acacia (*A. Westiana*, De Candolle). An ornamental, evergreen, hothouse tree, of the island of Santa Cruz: prickles bent back; leaves with eight pairs of leafits, every leafit having fifteen to twenty-seven pairs of line-like, acute leaflets, a gland at the base of the leaf-stalk, and one between the outer pair of leaflets; flowers in a terminal panicle; propagated by cuttings in sandy peat. *Mimosa paniculata*, West.—D. C. Sp. 165.

2. *Leaves with less or more than ten pairs of leafits.*

213. Courrant's Acacia (*A. Courrantiana*, De Candolle). An ornamental, evergreen, hothouse tree, twenty feet high, from the Canaries in 1818: prickles few, bent back; leaves with eight to ten pairs of leafits, every leafit having fifteen to twenty pairs of line-like, oblong leaflets; no glands on the leaf-stalks; flowers in terminal and axillary clusters; propagated by cuttings in sandy peat.—D. C. Sp. 168.

214. Intsia-like Acacia (*A. Intsioides*, De Candolle). An ornamental, evergreen, bark-stove tree, native country unknown: prickles bent back; leaves with eight to ten pairs of leafits, every leafit having about twenty-five pairs of line-like, oblong leaflets, slightly bent inwards; a gland at the base of the leaf-stalk; branches and leaves smooth; propagated by cuttings in sandy peat.—D. C. Sp. 163.

215. Feathered Acacia (*A. pennata*, Willdenow). An ornamental, evergreen, hothouse tree, twenty feet high, from Ceylon and Madagascar, in 1773; prickles bent back; leaves with eight to ten pairs of leafits, every leafit having twenty to thirty pairs of line-like, oblong leaflets; a depressed gland at the base of the leaf-stalk; flowers yellow, in heads, on short stalks, aggregate, and disposed in a terminal prickly panicle; propagated by cuttings in sandy peat. *Mimosa pennata*, Linnæus.—D. C. Sp. 164.

3. *Leaves with ten or more pairs of leafits.*

216. Arroophul Acacia (*A. arrophula*, D. Don). An ornamental, evergreen, hothouse tree, twenty feet high, from Sirinagur in 1818: prickles bent back; leaves with many pairs of leafits, every leafit having many pairs of line-like, unequal-sided, blunt, fringed leaflets; heads of flowers single or in fives, in terminal panicles; propagated by cuttings in sandy peat.—D. C. Sp. 172.

217. Large-glanded Acacia (*A. megaladena*, Desvaux). An ornamental, evergreen, hothouse tree of the East Indies: prickles minute; leaves with many pairs of leafits, every leafit having many pairs of line-like smooth leaflets; a gland above the base of the leaf-stalk; flowers in clusters; pod smooth; propagated by cuttings in sandy peat.

218. River-side Acacia (*A. riparia*, Humboldt). An ornamental, evergreen, hothouse, very tall tree, from the confluence of the Amazon and Chamaya: prickles hooked; leaves with ten to eleven pairs of leafits, every leafit having thirty to fifty pairs of line-like, fringed leaflets; glands on the leaf-stalks; heads of flowers axillary, single; propagated by cuttings in sandy peat.—D. C. Sp. 169.

Prickles scattered; stems climbing.

219. Guilandina Acacia (*A.? Guilandinæ*, De Candolle). An ornamental, evergreen, climbing, bark-stove shrub, ten feet high, from Cayenne in 1820: leaves with four pairs of leafits, every leafit having two pairs of leaflets, with a gland under the top pair of leaflets; propagated by cuttings in sandy peat.—D. C. Sp. 174.

220. Twiggy Acacia (*A. sarmentosa*, Desvaux). An ornamental, evergreen, climbing, bark-stove shrub, ten feet high; native country not known; introduced in 1820: leaves doubly winged, with seven pairs of leafits, every leafit having many pairs of blunt, line-like leaflets, with a minute gland above the base of the leaf-stalk.

221. Climbing Acacia (*A. scandens*, Willdenow). An ornamental, evergreen, climbing, bark-stove shrub, ten feet high, from Brazil in 1780: leaves with many pairs of leafits, every leafit having many pairs of leaflets, with a gland between each of the ten or twelve top pairs of leafits; propagated by cuttings in sandy peat.—D. C. Sp. 173.

B. Thornless (*not furnished with prickles nor thorns*): *Anthers hairy; stigma pencil-formed.* "*Trichodeæ.*"

222. Hairyish-anthered Acacia (*A. trichodella*). A shrub of St. Domingo: leaves with two pairs of leafits, each leafit bearing two to four pairs of leaflets, and the leaf-stalk without a gland. *A. pseudotrichodes*, De Cand.—D. C. Sp. 177.

223. Hairy-anthered Acacia (*A. trichodes*, Willdenow). An ornamental, evergreen, bark-stove shrub, eight feet high, from Peru in 1818: leaves with two to three pairs of leafits, each leafit having three to five pairs of egg-oblong acute leaflets, with an erect oblong gland between the lower pair of leafits: flowers white: propagated by cuttings in sandy peat. *Mimosa trichodes*, Jacquin.—D. C. Sp. 176.

Anthers smooth; stigma simple. "*Julibrissineæ,*" *Silk-Trees.*

1. *Every leaf having less than ten pairs of leafits,—Each leafit with less than ten pairs of leaflets.*

224. Beautiful Acacia (*A. formosa*, Kunth). An ornamental, evergreen, bark-stove shrub, ten to twelve feet high, from Mexico, in 1825: leaves with two pairs of leafits, each leafit bearing five to six pairs of inversely egg-oblong

elliptic leaflets; petals without glands; leaf-scales large, oblong, blunt: flowers white, in axillary heads; propagated by cuttings in sandy peat.—Kunth, Mim., p. 102, T. 32. D. C. Sp. 166.

225. Jupunba Acacia (*A. Jupunba*, Willdenow). A tree of Brazil: leaves with four to five pairs of leafits, every leafit having six to eight pairs of egg-oblong blunt leaflets, clothed with hairy down beneath; heads of flowers axillary.

226. Lebbek, or Lœbach Acacia (*A. Lebbek*, Willdenow). An ornamental, evergreen, bark-stove tree, twenty feet high, from Upper Egypt in 1823: leaves with two to four pairs of leafits, every leafit having about six to eight pairs of oval leaflets; leaf-stalk without glands; flowers, from March to June, pink, swelling in aggregate heads; pod seven to eight seeded: propagated by cuttings in sandy peat. *Mimosa Lebbek*, Linnæus; *Acacia Habbas*, Link, not Delile; *Cassia planisiliqua*, Burmann, but probably exclusive of the leaves.—D. C. Sp. 184.

227. Many-flowered Acacia (*A. multiflora*, Humboldt). A tree, twenty feet high, from the eastern declivities of the Andes: leaves with three pairs of leafits, every leafit having six to nine pairs of oblong, acute, smooth leaflets; leaf-stalks without glands; clusters axillary, two to five together; stamens fifteen.—D. C. Sp. 183.

228. Blackish Acacia (*A. nigricans*, R. Brown). An ornamental, evergreen, greenhouse shrub, eight feet high, from New Holland in 1833: leaves with two pairs of leafits, bearing five to seven pairs of inversely egg-oblong blunt leaflets on each of the upper leafits, and two to three pairs on each of the lower leafits; one or two glands on the leaf-stalk; flowers, from May to July, yellow, in single heads; pod six to seven seeded; propagated by cuttings in sandy peat. *Mimosa nigricans*, Labillardiere; *Acacia nigricans*. Bot. Mag. 2188.—D. C. Sp. 179.

229. Tall Acacia (*A. procera*, Willdenow). An ornamental, evergreen, bark-stove tree, sixty feet high, from the East Indies in 1816: leaves with four pairs of leafits, every leafit having five to eight pairs of egg-oblong leaflets; a depressed gland at the base of the leaf-stalk; flowers pale yellow, in heads disposed in terminal panicles; pod six to seven inches long; propagated by cuttings in sandy peat.

230. Rough Acacia (*A. strigosa*, Link). A shrub eight feet high, from the south-west coast of New Holland in 1803: leaves with two pairs of leafits, each leafit having two to three pairs of leaflets; leaf-scales rather bristly, temporary; flowers from March to June, yellow, in single heads. *Acacia ciliata*, R. Brown, not Willdenow.—D. C. Sp. 180.

231. Wandering Acacia (*A. vaga*, Willdenow). An ornamental, evergreen, bark-stove tree, forty feet high, from Brazil in 1818: leaves with three pairs of leafits, with three pairs of smallish leaflets on each of the terminal leaflets, and one to two pairs on the lower leafits; heads of flowers white, axillary, two to three together: propagated by cuttings in sandy peat.—D. C. Sp. 180.

Each leafit with less or more than ten pairs of leaflets.

232. Two-coloured Acacia (*A. discolor*, Willdenow). An ornamental, evergreen, greenhouse shrub, ten feet high, from New Holland in 1788: branches downy; leaves with five pairs of leafits, every leafit having nine to twelve pairs of oblong, acute leaflets, pale on the under surface; leaf-stalk woolly, with a gland at the base; flowers from March to June, yellow, in heads disposed along the axillary flower-stalks in long clusters; pod flat, two inches and a half long, by eight to ten lines in width: propagated by cuttings in sandy peat. *Mimosa botrycephala*, Ventenat; *Mimosa discolor*, Andrews.—D. C. Sp. 202.

233. Lambert's Acacia (*A. Lambertiana*, D. Don). An ornamental, evergreen, greenhouse shrub, six or eight feet high, from Mexico in 1818: leaves with two to three pairs of leafits, every leafit having nine to twelve pairs of oval-oblong leaflets, and these blunt at each end; branches and leaves velvety; leaf-stalk glandless; flowers from May to June; heads of flowers three to five together, in a cluster; stamens twenty to twenty-five; filaments purple; propagated by cuttings in sandy peat.—Bot. Reg. 9, T. 721.

234. Showy Acacia (*A. speciosa*, Willdenow). An ornamental, evergreen, hothouse shrub, eight feet high, from the East Indies in 1742: leaves with four to five pairs of leafits, every leafit having seven to eleven pairs of oval-oblong, blunt leaflets; a gland at the base of the leaf-stalk: flowers from August to September, white, in heads two to three together, axillary, on long flower-stalks; propagated by cuttings in sandy peat. *Mimosa speciosa*, Jacquin.—D. C. Sp. 189.

Each leafit with more than ten pairs of leaflets.

235. Gland-bearing Acacia (*A. adenophora*, Sieber). A tree of New Holland, varying from ten to twenty feet in height: leaves with eight pairs of leafits, every leafit having many pairs of bluntish, smooth leaflets; branches and leaf-stalks glandular and smooth; heads of flowers in axillary clusters.—Spreng. Syst. 3. p. 140.

236. Angular Acacia (*A. angulata*, Desvaux). An ornamental, evergreen, greenhouse tree, ten to twenty and thirty feet high, from New Holland in 1820: branches four-angled; leaves with five to seven pairs of leafits, every leafit having about thirty pairs of very narrow line-like leaflets, which are generally alternate; one perforated gland beneath the leafit, and one between each of the leaflets; flowers from June to July, small, yellow, in heads disposed in long clusters along the axillary flower-stalks; propagated by cuttings in sandy peat. *Acacia sulcipes*, Sieber.—D. C. Sp. 203.

237. Spleen-wort-like Acacia (*A. asplenioides*, Von Martius). A tree or shrub of Brazil: leaves with two to three pairs of leafits, each leafit having twelve to fifteen pairs of leaflets; leaf-stalk hairy; flowers in globose bundled terminal spikes; stamens long and purple.—D. C. Sp. 234.

238. Two-headed Acacia (*A. biceps*, Willdenow). A tree of Para, in Brazil: leaves with four to five pairs of leafits, every leafit having about sixteen pairs of distant, lance-shaped, fringed leaflets; a gland on the leaf-stalk beneath the lower pair of leafits; heads of flowers in pairs, axillary.

239. Two-pointed Acacia (*A. bimucronata*, De Candolle). A native tree of Brazil: leaves with six to eight pairs of leafits, every leafit having twenty-eight pairs of oblong-line-like smooth leaflets; two small sharp points on the lower part of each leafit; a velvety gland between every pair of leafits; and the heads of flowers disposed in a loose terminal panicle.—D. C. Sp. 210.

240. Caraccasian Acacia (*A. Caracasana*, Willdenow). An ornamental, evergreen, hothouse shrub, eight to twelve feet high, from Caraccas in 1817: leaves with five pairs of leafits, every leafit having twenty pairs of line-like, bluntish leaflets; leaf-stalk inclined to be downy, but without glands; flowers in heads two to three collected together; calyx having the margin glandular; the stamens with purple filaments; propagated by cuttings in sandy peat. *Mimosa Caraccasana*, Jacquin.—D. C. Sp. 197.

241. Divaricate Acacia (*A. divaricata*, Willdenow). An ornamental, evergreen, greenhouse tree, twenty feet high, from the East Indies in 1820: leaves with six to nine pairs of leafits, every leafit having forty pairs of line-like blunt leaflets; a convex stalkless gland beneath the lower pair of leafits; leaf-scales half-egg-oblong; flowers white in axillary heads from one to three together; propagated by cuttings in sandy peat. *Mimosa divaricata*, Jacquin.—D. C. Sp. 211.

242. Fern-leaved Acacia (*A. filicina*, Willdenow). An ornamental, evergreen, hothouse shrub or tree, twenty feet high, from Mexico in 1825: leaves with about six pairs of leafits, every leafit having fifty to seventy pairs of line-like, acute, fringed leaflets; leaf-stalk glandless, covered with long soft hairs; flowers with numerous stamens, in long clusters; pod line-like, flat, thick margined, and covered with soft hair; propagated by cuttings in sandy peat. *Mimosa filicioides*, Cavanilles; *Mimosa pterisina*, Poiret.—D. C. Sp. 205.

243. Yellow Acacia (*A. flava*, Sprengel). A tree of St. Martha: leaves with seven to nine pairs of leafits, every leafit having thirteen to twenty-five pairs of line-like, sharp-

pointed, smooth leaflets; leaf-stalk woolly, with a gland at the base; flowers yellow; pod flat and blunt, ending in a small sharp point, eight to ten-seeded.—D. C. Sp. 212.

244. Leafy Acacia (*A. frondosa*, Willdenow). An ornamental, evergreen, bark-stove tree, thirty feet high, from the East Indies in 1816: leaves with six pairs of leafits, every leafit having fourteen pairs of distant lance-shaped leaflets; branches, leaf-stalks, and under surface of the leaflets downy; a gland between the lower pair of leafits; flowers white, in single axillary heads; pod line-like and flat; propagated by cuttings in sandy peat.—D. C. Sp. 207.

245. Sea-green Acacia (*A. glauca*, Willdenow). An ornamental, evergreen, greenhouse shrub, five to ten feet high, from South America in 1690: leaves with four to six pairs of leafits, every leafit having twelve to fifteen pairs of distant line-like, acute leaflets; leaf-stalk downy, and sometimes glandular beneath the lower pair of leafits; flowers from June to July; heads of flowers generally in pairs, axillary; flowers white, five parted; stamens ten; pod four inches long, and two lines broad, almost without foot-stalks; propagated by cuttings in sandy peat. *Mimosa glauca*, Linnæus.—D. C. Sp. 192.

246. Inundated Acacia (*A. inundata*, Von Martius). A tree of Brazil: leaves with three pairs of leafits, every leafit having twelve to thirteen pairs of oblong, lance-shaped unequal-sided, ribbed leaflets; leaf-stalks downy, with one gland in the middle and one at the tip; heads of flowers in axillary clusters on downy flower-stalks shorter than the leaves.—Mart. Reis. Bras.

247. Broad-podded Acacia (*A. latisiliqua*, Willdenow). An ornamental, evergreen, hot-house shrub, five to ten feet high, from South America in 1777: leaves with five pairs of leafits, every leafit having ten pairs of elliptic blunt leaflets; leaf-scales obliquely heart-shaped; flowers, from March to June, white, in aggregate heads, forming a terminal pannicle; pod flat, oblong, supported on a long foot-stalk; propagated by cuttings in sandy peat. *Mimosa latisiliqua*, Linnæus.

Var. a. A. paucifolicola, De Candolle. A shrub or tree of St. Domingo: leaves with three to four pairs of leafits, each leafit having four to six pairs of leaflets.

248. Lax Acacia (*A. laxa*, Willdenow). A tree fifteen feet high, from the Caraccas: leaves with four pairs of leafits, every leafit having twelve to twenty-four pairs of line-like oblong leaflets; leaf-stalks clothed with rusty velvety down, heads of flowers axillary, on long flower-stalks; filaments purple; pod four inches long.—D. C. Sp. 188.

249. Lebbek-like Acacia (*A. lebbekioides*, De Candolle). A tree, thirty feet high, from the island of Timor: leaves with three to eight pairs of leafits, every leafit having ten to twenty pairs of oval-oblong smooth leaflets; leaf-stalk glandless, but covered with spreading down; pod seven to nine-seeded: differing from the *A. Lebbek* in the leaflets being narrower and more numerous, and also in other characters: propagated by cuttings in sandy peat.—D. C. Sp. 187.

250. White-headed Acacia (*A. leucocephala*, Link.). An ornamental, evergreen, hothouse shrub, five to ten feet high, from South America in 1823: leaves with four to five pairs of leafits, every leafit having twelve to fifteen pairs of oblong-line-like, acute leaflets; leaf-stalk downy, sometimes having one or more glands beneath the lower pairs of leafits; flowers, from July to August, white, in heads which are axillary, and commonly in pairs; pod standing on a foot-stalk about as long as the flower-stalks; broader and shorter than the pod of the *A. glauca*; propagated by cuttings in sandy peat.

251. Fringe-podded Acacia (*A. lomatocarpa*, De Candolle). An ornamental, evergreen, bark-stove tree, thirty feet high, from Pondicherry in the East Indies in 1824: leaves with five pairs of leafits, every leafit having fifteen pairs of oblong and rather sickle-shaped leaflets; a gland between every pair of leaflets; flowers pale yellow, loosely pannicled, four-parted; pod girded by a thickened margin: propagated by cuttings in sandy peat. *Mimosa marginata*, Linnæus.

252. Club-moss-like Acacia (*A. lycopodioides*, Desvaux). A shrub; native country not known: leaves with three pairs of leafits, every leafit having many pairs of minute and rather downy leaflets; leaf-scales distinct, lance-shaped, streaked; flowers in headed spikes, on long flower stalks. *Mimosa lycopodioides*, Persoon.—D. C. Sp. 198.

253. Soft Acacia (*A. mollis*, Wallich). A tree forty feet high, of Nepaul; velvety in all its parts: leaves with four to eight pairs of leafits, every leafit having many pairs of half-egg-oblong, acute leaflets; a concave gland above the base of the leaf-stalk, and one between each of the top pairs of leaflets; flowers yellow, disposed in bundles at the tops of the branches; filaments red, very long, and united into one body at the base.—Wall. Pl. Rar. Asiat. 2, p. 76, T. 177.

254. Nemu Acacia (*A. Nemu*, Willdenow). A tree of Japan, where it is called the "Nemu:" leaves generally with nine pairs of leafits, every leafit having many pairs of acute leaflets divided into two parts; a gland at the base of the leaf-stalk; heads of flowers disposed in a terminal panicle; pod line-like, woolly. *Mimosa arborea*, Thunberg; and *M. ciosa*, Thunberg.—D. C. Sp. 216.

255. Onyrarema Acacia (*A. onyrarema*, De Candolle). A tree of Guiana, where it is called the "Onyrarema:" leaves with six pairs of leafits, every leafit having thirty pairs of oblong, smooth, two-ribbed leaflets, which are obliquely blunt at the base; leaf-stalk acutely three or four-angled, a little winged, and furnished with an oblong, depressed gland at the base. *Mimosa Onyrarema*, Aublet.—D. C. Sp. 208.

256. Most fragrant Acacia (*A. odoratissima*, Willdenow). An ornamental, evergreen, bark-stove tree, forty feet high, from the coast of Coromandel in 1790: leaves with three to four pairs of leafits, every leafit having ten to twelve pairs of oval-oblong leaflets; a gland at the base of the leaf-stalk, and one beneath the top pair of leafits; flowers pale yellow, very sweet scented; heads aggregate, disposed in a terminal panicle; propagated by cuttings in sandy peat. *Mimosa odoratissima*, Roxburgh.—D. C. Sp. 186.

257. Four-angled Acacia (*A. quadrangularis*, Link). An ornamental, evergreen, hothouse shrub, eight feet high, introduced in 1825, but the native country unknown: branches four-angled; leaves with five pairs of leafits, every leafit having many pairs of line-like, acute, fringed leaflets, the lower and outer ones the shortest; leaf-stalk woolly and without glands; leaf-scales lance-shaped; flowers, from June to July, axillary; flower-stalks and leaf-scales streaked; filaments white and long; propagated by cuttings in sandy peat.—D. C. Sp. 201.

258. Porto-Rico Acacia (*A. Portoricensis*, Willdenow). An ornamental, evergreen, hothouse, shrub, five to ten feet high, from Porto Rico in 1825: leaves with five pairs of leafits, every leafit having twenty pairs of line-like, blunt leaflets; leaf-stalk downy and glandless; branches downy; flowers in axillary heads, two to three together; calyx having its margin fringed; the stamens with long white filaments: propagated by cuttings in sandy peat. *Mimosa Portoricensis*, Jacquin; *Acacia alba* of the gardens.—D. C. Sp. 196.

259. Large-leaf-scaled Acacia (*A. stipulata*, De Candolle). An ornamental, evergreen, bark-stove tree, twenty to forty feet high, from Bengal in 1800: leaves with five to seven pairs of leafits, every leafit having twenty to thirty pairs of oblong leaflets; the under surface of the leaflets, as also the leaf-stalks, flower-stalks and branches woolly; glands egg-oblong; leaf-scales egg-oblong-heart-shaped, acute, large, and permanent; flowers white; pod flat, six inches long and nine lines broad; propagated by cuttings in sandy peat. *Mimosa stipulata*, Roxburgh.—D. C. Sp. 209.

260. Three-angled Acacia (*A. tetragona*, Willdenow). An ornamental, evergreen shrub, seven feet high, from Caraccas in 1820: branches three-angled; leaves with five to six pairs of leafits, every leafit having sixteen to twenty-nine pairs of line-like acute leaflets, the outer ones the largest; flowers white, in axillary heads; pod line-like, blunt, with thick margins; propagated by cuttings in sandy peat.

Claw-podded Acacia (*A. ungulata*, Desvaux). A shrub or tree of the West Indies: branches downy; leaves commonly with three pairs of leafits, every leafit having many

pairs of line-like leaflets; flowers on long stalks; pod gristle-like.—D. C. Sp. 181.

262. Velvety Acacia (*A. villosa*, Willdenow). An ornamental, evergreen, hothouse shrub, six feet high, from Jamaica in 1806: branches velvety; leaves with five to six pairs of leafits, every leafit having about twelve pairs of egg-oblong, velvety leaflets; flowers white, in heads forming terminal panicles; pod short, flat, and hairy; propagated by cuttings in sandy peat. *Mimosa villosa*, Swartz.

2. *Leaves with less or more than ten pairs of leafits—the pairs of leaflets various.*

263. Bitter Acacia (*A. amara*, Willdenow). An ornamental, evergreen, bark-stove tree, thirty feet high, from the East Indies in 1816: leaves with eight to ten pairs of leafits, every leafit having twenty to twenty-five pairs of line-like, bluntish, smooth leaflets; flowers white, in heads two to six together; axillary, pod line-like, flat, acute, and eight-seeded. *Mimosa amara*, Roxburgh.—D. C. Sp. 215.

264. Tree Acacia (*A. arborea*, Willdenow). An ornamental, evergreen, bark-stove tree, forty feet high, from Jamaica and Porto Rico in 1768: leaves with seven to twelve pairs of leafits, every leafit having sixteen to eighteen pairs of oblong smooth leaflets divided into two parts; a depressed gland on the leaf-stalk between each pair of leafits; flowers pale-flesh-coloured, in heads two to three together and axillary; pod twisted. *Mimosa arborea*, Linnæus; *M. filicifolia*, Lamarck.—D. C. Sp. 214.

265. Bertero's Acacia (*A. Berteriana*, Balbis). A tree of St. Domingo: leaves with nine to ten pairs of leafits, every leafit having about forty pairs of oblong, line-like leaflets, shining above, pale beneath; a stalkless gland at the base of the leaf-stalk, and one between the last pair of leafits; heads of flowers in a panicle; stamens fifteen, three times the length of the corolla; pod flat, smooth.

266. Decurrent Acacia (*A. decurrens*, Willdenow). An ornamental, evergreen, greenhouse tree, six to twenty feet high, from New Holland in 1790: leaves with nine to eleven pairs of leafits, every leafit having thirty to forty pairs of narrow, line-like, distant leaflets; a gland on the common leaf-stalk between every pair of leafits; branches and leaf-stalks acute, angled; flowers from May to July, yellow, in heads placed in clusters along the axillary flower-stalks; propagated by cuttings in sandy peat. *Mimosa decurrens*, Ventenat.—D. C. Sp. 220.

267. Silk-tree Acacia (*A. Julibrissin*, Willdenow). A deciduous tree, forty-feet high, from the Levant in 1745; said to be named after its Persian term *Gul-ebrouschim*, or *Ghul-ibrichim*, from its silky flowers: leaves with eight to twelve pairs of leafits, every leafit having about thirty pairs of halved, oblong, acute, slightly fringed leaflets; a flattish round gland at the base of the leaf-stalk; flowers in August white, in heads forming a terminal panicle; stamens near one inch long; pod flat, membranaceous and smooth; propagated by cuttings in sandy peat. *Mimosa arborea*, Forskal; *M. Julibrissin*, Scopoli.—D. C. Sp. 217.

268. Softest Acacia (*A. mollissima*, Willdenow). An ornamental, evergreen, hothouse tree, ten to twenty feet high, from Van Diemen's Land in 1810: leaves with from eight to eighteen pairs of leafits, every leafit having thirty to forty pairs of line-like, crowded, woolly leaflets; glands on the common leaf-stalk, one between every pair of leafits; flowers from July to August, heads of flowers in clusters along the axillary flower-stalks; pod line-like, smooth, blunt, flat, eight to nine-seeded; propagated by cuttings in sandy peat. *Acacia decurrens B. mollis*, Ker; *A. mollis*, Sweet.

269. Downy Acacia (*A. pubescens*, R. Brown). An ornamental, evergreen, greenhouse shrub, ten feet high, from the eastern coast of New Holland in 1790: stem and branches woolly; leaves with three to ten pairs of leafits, every leafit having six to eighteen pairs of line-like smooth leaflets; leaf-stalk glandless; flowers from March to June, heads of flowers small, yellow, globose, on axillary flower-stalks, in clusters; propagated by cuttings in sandy peat. *Mimosa pubescens*, Ventenat.—D. C. Sp. 204.

270 Small-umbelled Acacia (*A. umbellulifera*, Kunth). A tree found near the City of Mexico: leaves with seven to ten pairs of leafits, every leafit having seventeen to thirty-seven pairs of line-like, fringed leaflets; flower-stalks axillary, bearing numerous small umbels of flowers; flowers white, on partial foot-stalks; stamens numerous.—Kunth, Mim. p. 100, T. 31.—D. C. Sp. 213.

3. *Every leaf having more than ten pairs of leafits, —Each leafit with less than twenty pairs of leaflets.*

271. Golden-flowered Acacia (*A. chrysantha*, De Candolle). A tree of Cayenne: leaves with twenty to twenty-three pairs of leafits, every leafit having eight pairs of line-like, oblong, blunt, smooth leaflets; branches smooth; leaf-stalk glandless; heads of flowers oblong, three to four together, axillary; stamens innumerable, and of a golden-yellow colour. —D. C. Sp. 233.

272. Panicled Acacia (*A. paniculata*, Willdenow). A tree of Para, in Brazil: leaves with twenty to twenty-five pairs of leafits, every leafit having ten pairs of line-like fringed leaflets; a gland on the leaf-stalk below the lower pairs of leafits; branches and leaf-stalks woolly; heads of flowers in axillary panicles.—D. C. Sp. 230.

Each leafit with from twenty to forty pairs of leaflets.

273. Narrow-leaved Acacia (*A. angustifolia*, De Candolle). An ornamental, evergreen, hot-house tree from the West Indies in 1820: leaves with fifteen to twenty pairs of leafits, every leafit having thirty to forty pairs of line-like, acute, fringed leaflets; a gland at the base of the leaf-stalk, and one between the top pair of leafits; heads of flowers two to three together; pod flat, smooth, six inches long, and eight to nine lines broad; propagated by cuttings in sandy peat.—D. C. Sp. 227.

274. Spiral Acacia (*A. contorta*, De Candolle). An ornamental, evergreen, bark-stove tree, twenty feet high, from Brazil in 1825: leaves with twelve to sixteen pairs of leafits, every leafit having thirty to thirty-five pairs of line-like, close leaflets; a pitcher-shaped gland on the footstalk beneath the lower pair of leafits; flowers in heads, axillary, single, on stalks an inch long; pod one-foot long, and spirally twisted; propagated by cuttings in sandy peat.—D. C. Sp. 223.

275. Whitened Acacia (*A. dealbata*, Link). A tree twenty-feet high, from New Holland in 1820: leaves with fifteen pairs of leafits, every leafit having thirty to thirty-five pairs of line-like, crowded, woolly leaflets; a perforated gland between almost every pair of leafits; flowers in August yellow, the heads forming clusters along the axillary flower-stalks; propagated by cuttings in sandy peat.

276. Esculent or Eatable Acacia (*A. esculenta*, Mocino and Sesse). An ornamental, evergreen, bark-stove tree, twenty-feet high, from Mexico in 1825: leaves with seventeen pairs of leafits, every leafit having thirty-two pairs of line-like, blunt leaflets; flowers white, in twin heads, and disposed in a terminal panicle; stamens ten; pod line-like, flat, tapering to the base, smooth, good for food; propagated by cuttings in sandy peat.—D. C. Sp. 225.

277. Pencil-bearing Acacia (*A. penicillifera*, Lagasca). A weak, twiggy shrub, two feet high from New Spain: leaves commonly with twelve pairs of leafits, every leafit having twenty to thirty pairs of line-like, blunt, slightly fringed, leaflets.—D. C. Sp. 224.

278. Foreign Acacia (*A. peregrina*, Willdenow). A tree, forty-feet high, found by the River Chota, in New Granada: leaves with fifteen to twenty pairs of leafits, every leafit having twenty-five to thirty pairs of oblong, line-like fringed leaflets; one gland in the middle of the leaf-stalk, and one to two at the top of the leafit; flowers white, in heads from two to four together; stamens ten, the anthers bearing a stalked gland at the tip. *Mimosa peregrina*, Linnæus.

279. Many-leaved Acacia (*A. polyphylla*). An ornamental, evergreen, hothouse tree, twenty feet high, from St. Martha in 1824: leaves with eleven to twelve pairs of leafits, every leafit having thirty pairs of halved-oblong, fringed leaflets; a small round gland in the middle of the leaf-stalk,

and one between each of the two or three uppermost pairs of leafits; flowers white, in heads forming an ample terminal panicle; stamens forty, scarcely three lines long; pod flat, membranaceous and smooth; propagated by cuttings in sandy peat. *Acacia riparia*, Bertero, not Kunth.

Each leafit with upwards of forty pairs of leaflets.

280. Small-leaved Acacia (*A. microphylla*, Willdenow). An ornamental, evergreen, hothouse shrub, from the Caraccas in 1826: leaves with twenty-five pairs of leafits, every leafit having fifty to sixty pairs of line-like, acute, fringed leaflets; leaf-stalk woolly, with a large gland at the base: propagated by cuttings in sandy peat.—D. C. Sp. 228.

281. Niopo Acacia (*A. Niopo*, Humboldt). A tree of the banks of Oroonoko, in South America, where it is known by the name "Niopo:" leaves with twenty to twenty-five pairs of leafits, every leafit having fifty to seventy pairs of line-like, acute, smooth, membranous, fringed leaflets, rather sickle-like and one-ribbed; a gland on the leaf-stalks above the base, and one between the top pair of leaflets; pod line-like, five-beaked. *Inga Niopo*, Willdenow.—D. C. Sp. 232.

282. Pectinated Acacia (*A. pectinata*, Humboldt, not Hoffmansegg). A tree found about the river Cassigniari, in South America: leaves with fifteen to sixteen pairs of leafits, every leafit having fifty to sixty pairs of line-like, blunt, sharp-pointed leaflets, smooth above, and of a rusty woolly appearance beneath; leaf-stalks without glands. *Inga pectinata*, Willdenow.—D. C. Sp. 231.

Each leafit with many pairs of leaflets, the number not definite.

283. Pretty Acacia (*A. bella*, Sello). A tree of Brazil: leaves with fifteen pairs of leafits, every leafit having many pairs of small, line-like, stiff-haired leaflets, lapping one over the other; leaf-stalks glandless.—Spreng. Syst. 3, p. 141.

284. Brazil Acacia (*A. Brasiliensis*, Sello). A tree of Brazil: leaves with many pairs of leafits, every leafit having many pairs of line-like, stiff-haired, minute leaflets, which lap one over the other; branches hairy; leaf-stalk hairy, glandless; heads of flowers in spikes.

285. Grateful Acacia (*A. grata*, Willdenow). An ornamental, evergreen, hothouse tree, from Brazil in 1820: leaves with fifteen to twenty pairs of leafits, every leafit having many pairs of line-like leaflets, the margins rough, with little sharp points; leaf-stalk glandular above the base; pod waved and unequally dilated; propagated by cuttings in sandy peat.—D. C. Sp. 228.

286. Bedewed Acacia (*A. irrorata*, Sieber). A shrub of New Holland: leaves with fifteen to twenty pairs of leafits, every leafit having many pairs of line-like, bluntish leaflets, covered with glittering particles like dew; leaf-stalk glandless.—Spreng. Syst. 3, p. 142.

287. Many-flowered Acacia (*A. multiflora*, Sello). A tree of Brazil: leaves with many pairs of leafits, every leafit having many pairs of smooth, lance-shaped, sickle-formed leaflets; branches smooth and angular; leaf-stalks without glands; heads of flowers in panicles.

V. Acacias not sufficiently known to describe confidently their character.

1. ***Leaves conjugately winged, or leaves with one pair of leafits.***

288. Few-leaved Acacia (*A. oligophylla*, Hoffmansegg). An ornamental, evergreen, hothouse tree, introduced in 1817: without prickles; leaves with one pair of leafits, each leafit having three to four pairs of egg-oblong leaflets, terminating in a little point; leaf-stalks thread-shaped; propagated by cuttings in sandy peat.—D. C. Sp. 236.

289. Rue-leaved Acacia (*A. ? rutæfolia*, Link). An ornamental, evergreen, hothouse shrub, introduced in 1810: leaves with one pair of leafits; leaflets unequal; flowers yellow; propagated by cuttings in sandy peat.

2. ***Plants without prickles or thorns, but with doubly-winged leaves.***

290. Twisted-fruited Acacia (*A. cochleocarpa*, Gomez). A tree of Brazil, where it is called the "Barbatimao:" leaves with three pairs of leafits, each leafit having about three pairs of leaflets; pod flattish, and spirally-twisted.—Gomez.

291. Guachapelle Acacia (*A. Guachapelle*, Humboldt). A tree, fifty feet high, from Peru, in woods near Guayaquil, where it is called the "Guachapelle:" leaves with four to five pairs of leafits, each leafit having five to six pairs of inversely egg-oblong, or rather elliptic-oblong or downy leaflets; a gland on the middle of the leaf-stalk and between each of the two upper pairs of leafits; pod ending in a long beak.—D. C. Sp. 240.

292. Hadje Acacia (*A. ? Hadiensis*, De Candolle). A tree from Arabia, about Hadje: leaves with three pairs of leafits, the lower having one scale, the upper a double scale, and each leafit supporting about fourteen pairs of oval line-like leaflets, the middle one the longest. *Mimosa Seyal*, Forskal, not of Delile.—D. C. Sp. 241.

293. Hoffmannsegg's Acacia (*A. Hoffmanseggii*, De Candolle). A tree of Brazil, about Rio Janeiro: leaves with four pairs of leafits, every leafit having many pairs of line-like, equal-sided, bluntish leaflets; leaf-stalk downy; a gland below the lower pair of leaflets, and one between the upper pair. *Acacia pectinata*, Hoffmansegg.—D. C. Sp. 238.

294. Houston's Acacia (*A. Houstoni*, Willdenow). An evergreen, ornamental, frame shrub, ten feet high, from Vera Cruz in 1729: leaves consisting of about six pairs of leafits, each leafit having many pairs of oblique, line-like leaflets, velvety beneath; leaf-stalks downy; flowers, in September and November, purple, in interrupted, terminal spikes; propagated by cuttings in peat and loam. *Gleditschia inermis*, Linnæus; *Mimosa Houstoni*, Herit.; *Acacia filicina*, Willdenow.—Bot. Reg. 98.

294. *b.* Java Acacia (*A. ? Javanica*, De Candolle). A tree of Java: leaves with four pairs of leafits, every leafit having seventy pairs of oval, lucid, blunt leaflets, the lower leafits bearing fewer leaflets than the upper ones. *Gleditschia Javanica*, Lamarck.—D. C. Sp. 239.

295. Prismatic Acacia (*A. prismatica*, Hoffmansegg). An ornamental, evergreen, hothouse tree, nearly resembling *A. discolor*, but neither its flowers, fruit, or native country, have been recorded: leaves with seven to eight pairs of leafits, every leafit having fourteen to seventeen pairs of oblong, two-coloured leaflets; branches angular; leaf-stalks smooth, the young leaves clammy; propagated by cuttings in sandy peat.—D. C. Sp. 242.

296. Beautiful Acacia (*A. ? venusta*, Willdenow). An ornamental, evergreen, bark-stove shrub, from America in 1816: leaves with three to five pairs of leafits, each leafit having fifteen to twenty pairs of sickle-like, rather acute, smooth leaflets; propagated by cuttings in sandy peat.

3. ***Plants with prickles: prickles at the base of the leaves, twin, but not so on the leaf-stalks.***

297. Needle-thorned Acacia (*A. ? acicularis*, Humboldt). A tree of South America: thorns straight, in pairs, needle-shaped; leaves with four pairs of leafits, every leafit having fifteen pairs of distant, fringed leaflets; propagated by cuttings in sandy peat.—D. C. Sp. 252.

298. Short-thorned Acacia (*A. brachyacantha*, Humboldt). An ornamental, evergreen, hot-house tree, from South America in 1824: thorns in pairs, hooked; leaves commonly with ten pairs of leafits, every leafit having about ten to twelve pairs of fringed leaflets; propagated by cuttings in sandy peat.—D. C. Sp. 250.

299. Fringe-leaved Acacia (*A. ciliata*, Humboldt). An ornamental, evergreen, bark-stove tree, from South America in 1822: thorns straight, awl-shaped, twin; leaves with three to four pairs of leafits, each leafit having thirteen pairs of fringed leaflets; propagated by cuttings in sandy peat.

300. Giraffe Acacia (*A. Giraffæ*, Willdenow). An ornamental, evergreen, bark-stove tree, forty to seventy-feet high, from the Cape of Good Hope in 1816, where it furnishes

food for the giraffe: thorns in pairs, united at the base, and as long as the leaves; leaves with three to six pairs of leafits, every leafit having ten to twenty pairs of leaflets, and one gland on the leaf-stalk between each pair of leafits; propagated by cuttings in sandy peat.—D. C. Sp. 253.

301. Guayaquil Acacia (*A.? Guayaquilensis*, Desfontaines). An ornamental, evergreen, bark-stove tree, ten feet high? from Peru, near Guayaquil in 1818: thorns opposite; leaves with two pairs of leafits, each leafit having three to five pairs of egg-oblong, greyish leaflets, the lower ones the smallest; propagated by cuttings in sandy peat.

302. Lentiscus-leaved Acacia (*A. lentiscifolia*, Desfontaines). An ornamental, evergreen, bark-stove tree, 20 feet high, from Mexico in 1824: prickles straight, awl-shaped; leaves commonly with four pairs of leafits, every leafit having about ten pairs of egg-oblong, sharp-pointed shining leaflets, with a stalkless gland between each of the pairs of leafits: propagated by cuttings in sandy peat. *Mimosa lentiscifolia*, Persoon.—D. C. Sp. 246.

303. Slender-leaved Acacia (*A.? leptophylla*, De Candolle). An ornamental, evergreen, hothouse tree, from South America in 1824: prickles straight, bristle-like, distinct, short; leaves with four to five pairs of leafits, every leafit having twelve pairs of oblong, distant leaflets, downy beneath; leaf-stalk downy, with a gland between the lower pair of leafits; propagated by cuttings in sandy peat.

304. Small-thorned Acacia (*A.? micracantha*, Desvaux). A tree of Cayenne: prickles very slender; leaves doubly-winged, downy; leaflets line-like, somewhat sickle-shaped, thin; flowers in spike-like clusters on short flower-stalks. *Mimosa semi-spinosa*, Linnæus.—D. C. Sp. 254.

305. Spreading Acacia (*A. patula*, Humboldt). An ornamental, evergreen, bark-stove tree, about twenty-feet high, from South America in 1818: thorns in pairs, united at the base; leaves with five pairs of leafits, every leafit having fifteen to twenty pairs of line-like, smooth leaflets; leaf-stalk somewhat hairy and without glands; propagated by cuttings in sandy peat.—D. C. Sp. 247.

306. Peruvian Acacia (*A. Peruviana*, Humboldt). An ornamental, evergreen, bark-stove tree, six feet high, from Peru in 1820: prickles bristle-like, in pairs; leaves with two pairs of leafits, each leafit bearing eleven to fifteen pairs of blunt, smooth leaflets; similar in habit to the *A. dipteræ*; propagated by cuttings in sandy peat.—D. C. Sp. 248.

307. Broad-podded Acacia (*A. platyloba*, Bertero). A very doubtful species, a native of St. Domingo, resembling the *A. Lebbek* and *A. latisiliqua*, but differing in being prickly: prickles hooked; leaves with three pairs of leafits, every leafit having two to three pair of inversely egg-oblong blunt leaflets; no glands on the leaf-stalk; pod flat, six inches long, and one inch and a half broad, two valved; seeds flat, shining. *Inga Magdalenæ*, Sprengel.

308. Greenish-flowered Acacia (*A.? virescens*, De Candolle). An ornamental, evergreen, bark-stove tree, about twenty feet high, from South America in 1820: prickles straight, bristle-like, distinct; leaves with two pairs of leafits, each leafit having twelve to twenty pairs of oblong, line-like leaflets, and a gland on the leaf-stalk between the lower pair of leafits; propagated by cuttings in sandy peat.

4. Furnished with thorns or prickles;—all scattered in an irregular manner, or some of them are at the base of the leaves;—those on the branches and leaf-stalks also scattered.

309. Bancroft's Acacia (*A. Bancroftiana*, Bertolini). An ornamental, evergreen, bark-stove tree, twenty feet high, from Jamaica, and similar in habit to the *A. platyloba:* prickles on branches scattered, those on the leaf-stalk in pairs at the base of the leaves, with two to five pairs of leafits, every leafit having two to five pairs of inversely egg-oblong blunt leaflets; no glands on the leaf-stalk; pod egg-oblong, smooth, rather fleshy, few-seeded, without foot-stalk; propagated by cuttings in sandy peat.—D. C. Sp. 257.

310. Variable-thorned Acacia (*A. heterocantha*, Burchell). An ornamental, evergreen, greenhouse tree, fifteen to twenty feet high, from the Cape of Good Hope in 1816: some of the thorns in pairs, short, bent back, and brown, others straight, longer, and white; branches downy; leaves downy, with four to six pair of leafits, every leafit having ten to fourteen pairs of close, oblong leaflets; pod line-like; propagated by cuttings in sandy peat.—D. C. Sp. 256.

311. Many-headed Acacia (*A. polycephala*, De Candolle). A tree of the Mauritius, very like the *A. concinna*, but differing in not having any leaf-scales: prickles a little hooked, and all scattered; leaves with six to nine pairs of leafits, every leafit having twenty pairs of line-like, acute leaflets; a large depressed gland at the base of the leaf-stalk, and one between the top pair of leafits; branches, leaf-stalks, and flower-stalks covered with velvety hair; heads of flowers globular, reddish-brown before they open, numerous, in terminal clusters; stamens white and numerous.—D. C. Sp. 258.

312. Rose-thorned Acacia (*A.? rhodocantha*, Desfontaines). An ornamental, evergreen, bark-stove tree, twenty-feet high, native country unknown: prickles at the base of the leaves in pairs, those on the leaf-stalk scattered; leaves with about seven pairs of leafits, lower pair smallest, each leafit having eight to twenty pairs of oblong, line-like leaflets; a flattish gland at the base of the leaf-stalk; propagated by cuttings in sandy peat.—D. C. Sp. 255. [A. C.]

ACACIA TREE (*Robinia Pseud-Acacia*, Linnæus). The Acacia tree is well known in America, from which it was introduced by the name of the Locust tree. It grows very rapidly in the early stages of its progress, so that in a few years, from seeds, plants of eight and ten feet high may be obtained. It is by no means uncommon to see shoots of this tree eight or ten feet high in one season. The branches are furnished with very strong, crooked thorns; the leaves are winged with eight or ten pairs of leafits, egg-oblong, bright green, entire, and without foot-stalks. The flowers come out from the branches in pretty long bunches, hanging down like those of the laburnum, or the still more lovely *Westeria Sinensis*. Each flower grows on a slender foot-stalk, smelling very sweet. It is of a white colour, but there is a rose-red variety. It blows in June; and when the tree is full of bloom makes a handsome appearance, and perfumes the whole air around. The flowers are followed by seed-pods, oblong, flat, having a longitudinal rib next the seeding suture, on the outside of that being drawn out into a membranous margin; one-celled, and two-valved. The seeds are sometimes as many as sixteen, kidney-shaped, ending in a hooked beak, like a lens, and are of a rusty colour.

In North America, where this tree grows to a very large size indeed, the wood is much valued for its duration. Most of the houses which were built at Boston in New England, on the first settling of the English, were constructed of this wood; and since then it has been much used in America for various purposes.

The seeds of the Acacia tree were first brought to Europe by M. Jean Robin, nurseryman to the King of France, and author of a "History of Plants." M. Robin brought the first seeds from Canada, in consequence of which, succeeding botanists have, in honour to his name, termed the genus *Robinia* to which the Acacia tree belongs. Soon after its introduction into France, the English gardeners received seeds from Virginia, from which many trees were raised.

Parkinson, who mentions the Acacia tree in his "Theatre of Plants," which was published in 1640, says then it was grown of an exceeding height by John Tradescant; and Evelyn recommended it to the notice of the nation in his "Sylva," which was presented to the Royal Society in 1662. In this work he observes, that

Acacia Tree.

the Acacia is well deserving of a place among our avenue trees, which is so well adapted to the adorning of our walks with their beautiful leaves and sweet flowers.

It is much to be regretted, however, in a national point of view, that these observations met with so little attention; for not only as an ornamental tree, but even as a forest timber tree, it is richly deserving the serious attention of every landed proprietor. Too frequently, indeed, have we had to regret, that after the introduction of new trees to this country, of the greatest importance to the nation, so little attention has been paid, comparatively speaking, to their general culture, and consequently their extensive spread in the early stages of their introduction.

There appears to have been very little notice taken of the Acacia tree till Bradley's time, in 1720; and he mentions only a few trees then growing in the court before Russell House, Bloomsbury, and in the old Palace Yard, Westminster.

Mortimer afterwards tells us, that a goodly number of Acacias were formerly planted in St. James's Park; and that in consequence of the high winds shattering some of their branches, they were all ordered to be cut down. We wish that the hint had been then taken, that the tree wanted only the shelter of the numerous offspring of our woods in order to show its native dignity, and spread its usefulness. The wood, when green, is of a soft texture, but becomes very hard when dry. It is as durable as the best white oak of North America, and esteemed preferable for axle-trees of carriages, trenails for ships, and many other important purposes. The turner finds the wood of the Acacia hard and well suited to his purpose, and is delighted with its smooth texture and beautifully delicate straw-colour.

The tree when aged abounds with certain excrescences or knots, which, when polished, are beautifully veined, and much esteemed by the cabinet-maker. It makes excellent fuel, and its shade is said to be less injurious than that of any other tree; while the leaves afford wholesome food for cattle. A gentleman in New England sowed several acres of it for this purpose alone.

It has been employed with signal success in Virginia for ship building, and is found to be very superior to American oak, ash, elm, or any other wood they use for that purpose. In New York it has been found, after repeated trials, that posts for rail-fencing, made of the Acacia tree, stand wet and dry near the ground, better than any other in common use, and will last as long as those of swamp cedar.

The Acacia tree seems happily adapted to ornamental planting. Whether as a single tree upon the grass, feathering to the ground line, or as a standard in the shrubbery, towering above a monotonous mass of sombre evergreens, the Acacia has great charms for us, and may justly be called a graceful tree; and, although its light, loose, and pleasing foliage admits the light, and seems to harmonize so delightfully with the polished lawn, or the

highly cultivated shrubbery (and there is hardly a shrubbery to be found without them), yet, we should like much to see the Acacia tree planted in the woods everywhere, where forest timber is an object of attention.

In France the Acacia tree appears to have been more generally diffused throughout the country than with us; for it does not only ornament their gardens, and shade their public walks, but the sprightly foliage of this beautiful tree shines through their woods and forests in every direction; so much so that it might be taken for an indigenous inhabitant of the soil.

In one of the Memoirs by the Agricultural Society at Paris, the properties of this tree are very highly extolled. Its shade, it is said, encourages the growth of grass. Its roots are so tenacious of the soil, and shoot up such groves of suckers, that when planted on the banks of rivers it contributes exceedingly to fix them as barriers to check the incursions of the stream. Acacia stakes, too, are more durable than any other known wood.

The memorialist tells us a story of a North American farmer in Long Island, who planted an ordinary field of fourteen acres with suckers of this tree, in the first year of his marriage, as a provision for his children. His eldest son married at twenty-two. On this occasion the farmer cut about three hundred pounds worth of timber out of his Acacia wood, which he gave his son to buy a settlement in Lancaster county. Three years after he did as much for a daughter. And thus he provided for his whole family, the wood in the meantime repairing by suckers all the losses it sustained.

The Acacia is evidently the tree referred to both by Evelyn and the Rev. W. Gilpin; but these accomplished writers appear only to have been acquainted with it as a garden plant in the shrubbery, rather than as a useful timber tree. "The French," says Evelyn, "have lately brought in the Virginian Acacia, which exceedingly adorns their walks. The tree is hardy against all incursions of our sharpest seasons, but our high winds, which, by reason of its brittle nature, it does not so well resist; and the roots, which insinuate and run like liquorice under ground, are apt to emaciate the soil, and therefore, haply, not so commendable in our gardens as they would be agreeable for variety of walks and shade."

Gilpin observes, that, "among elegant pendent trees, the Acacia should not be forgotten;" but it was evidently not sufficiently picturesque for that accomplished writer. He says, "the misfortune of the Acacia is, that it is not one of those grand objects, like the oak, whose dignity is often increased by ruin. It depends on its beauty rather than its grandeur, which is a quality more liable to injury. I may add, however, in its favour, that if it be easily injured, it repairs the injury more quickly than any other tree. Few trees make so rapid a growth."

We quite agree with these remarks, yet we have seen many instances where the judgment and skill of the planter have been exercised, and his endeavours crowned with complete success. The Acacia, like most other trees, requires shelter when young, if planted with a view for forest timber. The beauty of this tree has, however, been its misfortune, and utility has been sacrificed to ornament. We generally find the Acacia planted on the outskirts of woods, and other plantations, for its showy appearance, and when in exposed situations, from the rapidity of its growth, its pendent flowers and leafy branches but too frequently become the victims of the storm. This would not, however, be the case, were the Acacia planted for forest use, and sharing with other trees the shelter and warmth of the interior of our woods.

The choicest pieces only of the best oak timber are applied to the purpose of trenail-making in ship-building, and as the Sussex oaks are generally reckoned the best, most shipwrights, even in the north, have them from thence, and the demand for them is so great, that trenail-making is there become a very considerable manufacture. If it be proved that the Acacia tree is equal to our best oak for this important purpose in our naval architecture, then do we again strongly recommend (and we write practically) to every landed proprietor to plant the Acacia as a forest tree, more especially as it will grow upon almost any description of soil, but more particularly upon sandy or gravelly shallow soils, where the oak does not thrive.

In forty years the Acacia tree will grow sixty feet high, and will girth six feet, three feet from the ground; and although brittle in a young state, the characteristics of the timber of a grown tree are toughness and elasticity.

There are many fine stately Acacia trees on the banks of the Thames. On the estate of his Grace the Duke of Devonshire, at Chiswick House, there are some remarkably fine trees, which, from their size and appearance, we have no doubt were among the first introduced to this country. The first of these magnificent trees which we shall notice, measures in circumference nine feet, two feet above the ground, and at twenty feet high girths seven feet, with a trunk of measurable timber not less than fifty feet from the ground. Another tree, standing to the north-east of the house, measures seven feet six inches, two feet from the ground. This tree shows a beautiful, well-balanced head, rising from a trunk of fifteen feet high, girthing five feet six inches; the extreme height is sixty feet, and the circumference of its branches measures not less than one hundred and ninety-two feet. Two suckers have arisen from the roots of this Acacia tree at right angles, and at the distance of about thirty feet. They are twenty years old, are thirty-five feet high, and girth, severally, four feet six inches, and three feet eleven inches, twelve inches above the ground. There is another fine tree in a more distant part of the pleasure-ground, measuring seven feet four inches in circumference eighteen inches above the ground: and sixteen feet up the stem it girths six feet. Upon the lawn on the verge of the flower-garden stands another remarkably fine Acacia; for its age, we think, the finest we have seen. The branches take an equal bearing from the main stem at about fifteen feet high, and extend on all sides their beautiful foliage, covering a space two hundred and thirty feet in circumference. The stem measures six feet in circumference two feet from the ground, showing a clear, well-shaped stem up to the insertion of the branches. The extreme height of this tree is sixty-five feet, and it does not appear to be older than thirty-five years.

In the pleasure-grounds at Sion House many fine old Acacia trees are to be found, and several groups in the park there. But the finest, perhaps, in England, are growing on Claremont estate, Esher, Surrey. Sir Robert

Gardener occupies a small portion of this domain, at Milbourne, where may be seen some Acacia trees eighty years old. One, in particular, measures eleven feet in circumference three feet from the ground, tapering but very little till it sends out its lofty branches from the trunk at about fifteen feet from the ground, and is now perfectly sound. The extreme altitude of this remarkable tree is seventy feet,—forming, by the deep indentures of its bark and fine large limbs, a truly picturesque as well as an ornamental tree.

There are numerous Acacia trees throughout the grounds at Claremont, measuring seven and eight feet in circumference two feet from the ground, and, although growing in exposed situations, exhibit no symptoms of being shaken or unsound. It is worthy, perhaps, of observation, too, that these trees are growing upon very shallow soil, where the under-soil is nothing but sand and gravel.

In the grounds of Sir William Cooper, of Isleworth-house, there are also some very fine Acacia trees, not measuring less than eight feet in circumference three feet from the ground. There are, perhaps, more Acacias in the counties of Middlesex and Surrey, than in any other counties in England, but chiefly confined to the shrubbery and the lawn.

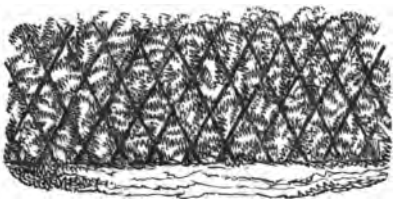
In many parts of Scotland the Acacia tree grows extremely well, and many very fine trees are to be found in the neighbourhood of Edinburgh. Sir John Nasmyth, Bart., has one at Dalwick, in Tweeddale, which measures between five and six feet in circumference about three feet from the ground, and six feet six inches close to the ground. But the finest group of these trees we have ever seen in this country, are at Niddrie Mareschall, near Edinburgh. One of these measures upwards of nine feet a few inches above the ground. It separates into two great limbs, one of which measures between five and six feet, and the other between four and five, in girth, Another tree in the same group, at three inches from the ground, measures six feet six inches round the base, and its three limbs measure severally, three feet two inches, three feet four inches, and three feet eight inches. And there is a third Acacia belonging to them, that measures six feet five inches at two feet and a half from the ground.

The Acacia also thrives well in Ireland, and there are many fine healthy trees in the neighbourhood of Dublin. It grows more rapidly in that country than it does in either England or Scotland.

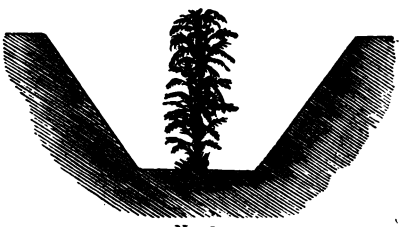
In the different states of Germany the Acacia seems to bear the rigour of their winters, and grows to a fine ornamental tree.

The only instance we have heard of the Acacia having been planted in any quantity for forest timber, is that of Sir George Saville, who planted many thousands of these trees at Rufford; so that the next generation may perhaps see a manufactory for the trenails of ships on the skirts of our Acacia woods.

As a durable timber it has been proved that nothing can exceed the Acacia wood, when of proper age. But there is one important use to which these trees may be applied, which has hitherto escaped the notice of the planter, namely, hedges. From its rapidity of growth it forms a fence capable of resistance in one-fourth of the time of any other plant hitherto used for that purpose. Had we to fence in a whole estate, we should, in preference to all others, plant Acacias. They bear clipping, and may be raised to twenty or thirty feet high, if required, and are so strong that no animal can force through them. Fences of this kind are common on the Continent, but generally of hornbeam. The only instance of an Acacia hedge we know of is to be seen round part of the boulevard of the city of Louvain. Plants for this purpose should be taken from the nursery lines four feet high, and planted as in the annexed sketch (No. 1). At every point where the stems cross one another, a natural union or grafting takes place, and as the stems increase in size, the spaces between will gradually decrease, so that in the course of a few years the fence becomes a complete wooden wall, not occupying a space more than twelve or fifteen inches, forming a barrier that no animal can force. Fences of this description may either be made on the level ground, or concealed from the distant view, as represented in No. 2.



No. 1.



No. 2.

We are at at a loss to account for the name commonly given to this tree by the Americans, namely, Locust tree; for the Locust tree (*Hymenæa Courbaril*) is a native of South America.

In the arboretum of the gardens of the Horticultural Society of London, there is a proof, perhaps the very best proof that this country affords, of the great rapidity of growth, and also the beauty of this truly interesting and highly valuable tree. About twelve years ago, this arboretum was planted for the express purpose of introducing the trees of all countries—the research of enterprising men. The Acacia was planted with the other individuals of this very splendid collection, and the result has been, that the Acacia has made greater progress than any of the oaks, the ash—the elm—the maple, or, indeed, any of the hard-wooded timber-trees within the walls of the gardens.

The Acacia trees, in their growth, are exceeded only by a few of the poplar and willow tribes.

In this short space of time the young Acacia trees measure, for their years, a very extraordinary height and girth. On the 21st of June, 1834, we measured six trees from among forty or fifty, and they respectively mea-

sured as follows, at about ten inches from the ground: the first, three feet nine inches, with a fine clear stem and a well balanced head; the second, three feet eight inches; the third, three feet one inch; the fourth, two feet nine and a half inches; the fifth, two feet seven inches; the sixth, two feet five and a half inches, and from twenty-five to thirty feet high.

There is a singular character about the suckers of this tree. They are rarely seen to appear on the lawn, but in the shrubbery frequently. They rise singly, not like the elm, and other trees, in thick masses, choking one another, but they start out of the ground at once, with all the boldness and vigour of a healthy shoot from a powerful stool; and in a sheltered situation will grow, the same year, from twelve to fifteen feet long from the ground; and it is the more remarkable, that these suckers grow in this vigorous way immediately under the shade of the parent, and other large trees. What is also very singular, so strongly are they attached to the root below the ground, at the insertion, that they are very rarely from accident displaced.

Mr. William Lindsey mentions a very striking instance of the astonishing rapidity of the growth of this tree. He observed a strong shoot make its appearance in one of the woods at Chiswick, and he had the curiosity to see what would be the result by applying a stake to this sucker for protection. By the end of the season it was twenty feet high, and measured three inches in circumference. When the full-grown old Acacia trees are felled, the following year hundreds of suckers will start up from the roots in all directions, and grow as freely as if a fresh plantation had been carefully made. So that on the score of economy, we know of no tree that can be planted equal to the Acacia. As an underwood it far exceeds any other tree in produce; and for stakes, arbour-poles, hop-poles, and pale fencing, there is no wood equal to Acacia. In America, the use of the Acacia has been confined to trenails of ships, in consequence of its scarcity; but were it either in that or this country as plentiful as oak, it would be applied for more purposes in naval architecture, such as knees, floor-timbers, and foot-hooks, being far superior to oak for its strength and duration, and from the tree arriving much sooner at perfection, and spreading into so many branches, it affords full as large a proportion of crooks and compass timber as the oak tree.

A cubic foot of Acacia, in a dry state, weighs from forty-eight to fifty-three pounds weight. If we compare its toughness, in an unseasoned state, with that of oak, it will not be more than 8-100 less. Its stiffness is equal to 99-100 of oak; and its strength nearly 96-100; but if it were properly seasoned, it might, possibly, be found much superior to oak in strength, toughness, and stiffness. A piece of Acacia, unseasoned, two feet six inches long, and an inch square in the vertical section, broke when loaded with a weight of two hundred and forty-seven pounds avoirdupois. Its medium cohesive force is about 11-500 pounds. (*Dictionary of Architecture.*)

We are not aware that this tree has added in any shape to the list of medicines. The Acacia of the shops was formerly made from the unripe pods of the true Acacia tree; but of later years, the Acacia Germanica of the shops is made from unripe sloes, and is preferred as an astringent medicine to the true Acacia.

The Acacia is easily propagated from seeds or suckers. [L. F.]

ACÆNA, Vahl (from the Greek, *ἄκαινα*, "a thorn," the calyx being furnished with thorny bristles). Thorn Wort. *Diandria Digynia*, Linnæus; *Sanguisorbeæ*, Jussieu. Calyx in form of a tube, furnished with two scales at the base, and commonly having the ends split and hook-barbed bristles; petals four or five, free or united at the base, inserted into the tip of the calyx; stamens two to four; seeds one to two, dry, one-seeded, inclosed within the tube of the calyx; pistils terminal; leaves unequally winged; leaflets toothed; flowers small, in heads or spiked clusters.—D. C. Prod., Vol. II., p. 592.

I.

Calyx furnished all round with hook-barbed bristles: petals united at the base.

1. Agrimony-like Thorn Wort (*A. agrimonioides*, Humboldt). A frame shrub, six inches high, from Mexico, in cold places near Truquillo, and similar to the *A. lappocea:* flowers in spikes, alternate, lower ones distant; leaflets oblong, coarsely toothed, downy when young, smooth afterwards; propagated by division or by seed in sandy peat.—D. C. Sp. 2.

2. Longish Thorn Wort (*A. elongata*, Linnæus). A frame shrub from Mexico: stem about one foot high, ascending; flowers disposed in longish spiked clusters; leaflets oblong, downy beneath; propagated by division or by seed in sand, peat, and loam.—D. C. Sp. 3.

3. Eupatorian Thorn Wort (*A. Eupatorii*, Sprengel). A perennial of Brazil: the stem erect, spreading, silky-velvety; leaves wing-cut; leaflets oblong, at the base oblique, cut saw-toothed; underneath hoary-silky; flowers scattered, glomerated, and disposed in interrupted spikes.

4. Cut-leaved Thorn Wort (*A. incisa*, Lindley). A hardy perennial, six inches high, from Chili, near the limits of the snow: stem erect; flowers in spike-like heads, the lower ones distant; leaves with six to seven pairs of oblong, wedge-like, deeply-toothed leaflets; propagated by division or by seed in sand, peat, and loam.—Bot. Reg. No. 1271.

5. Burdock Thorn Wort (*A. lappacea*, Ruiz). A frame shrub, six inches high, from Peru, on the rocks of Tarma: stem erect; flowers in clusters, distant; stamens four to five; leaflets oblong; propagated by division in sand, peat, and loam.—Ruiz. et Pav. Fl. Per., I. p. 66, T. 103, f. a.

6. Dark Thorn Wort (*A. latebrosa*, Aiton). A frame perennial evergreen, one foot high, from the Cape of Good Hope in 1774: stem resting on the ground; flowers in longish spikes; flowers, from April till June, green; flower-stalks scape-formed; leaflets oblong, cut, hoary below; propagated by cuttings in sand, peat, and loam. *Agrimonia decumbens*, Linnæus the younger; *Ancistrum decumbens*, Thunberg; *Ancistrum latebrosum*, Gærtner.—D. C. Sp. 4.

7. Many-cut Thorn Wort (*A. multifida*, Dietrick). A perennial of Chili: the stem ascending, leaves wing-cut, four to five-joined; leaflets three to five-parted, silky, line-like; spikes somewhat globular, lower flowers distant.—Bot. Reg., 1271.

8. Myriad-leaved Thorn Wort (*A. myriophylla*, Lindley). A frame perennial, six inches high, from Chili: stems erect; leaflets line-like, deeply wing-cut, the segments very narrow; flowers in cylindrical spikes; fruit egg-shaped; propagated by division or by seed in sand, peat, and loam.—Bot. Reg., 1271.

9. Sheep Thorn Wort (*A. ovina*, Cunningham). An

evergreen hardy perennial creeper, six inches high, from New Holland in 1818: the whole plant covered with white hairs; leaflets deeply wing-cut, the segments oblong and blunt; flowers, in June and July, green, in oblong spikes, the lower flowers distant; propagated by division in common garden soil.—Field's N. S. Wales, p. 358.

10. Wing-cut-leaved Thorn Wort (*A. pinnatifida*, Ruiz), An evergreen frame perennial, six inches high, from the hills of Chili and the Straits of Magellan in 1822: stem erect; flowers in cylindrical spikes, lower ones rather distant; stamens five to ten; leaves line-like-spear-shaped, deeply toothed or cut, rather hairy; flowers, in May and June, green; propagated by division in sandy peat.—R. et Pav. Fl. Per., I. p. 68, T. 104, f. 1, b. D. C. Sp. 5.

11. Silky Thorn Wort (*A. sericea*, Jacquin). A frame perennial, six inches high, from New Spain: stem lying down; flowers in globose heads; leaflets inversely egg-oblong, deeply toothed, downy, silky on the back. *Polerium Australe*, Salisbury; *Ancistrum acorna*, Lagasca.—Jacq. Til. Eclog., I. T. 55. D. C. Sp. 6.

II.

CALYX TUBULAR, ENDING AT THE TIP IN FOUR TO FIVE HOOK-BARBED BRISTLES: PETALS FOUR TO FIVE, DISTINCT.

12. Ascending Thorn Wort (*A. adscendens*, Vahl). A hardy perennial, six inches high, from the Straits of Magellan in 1822: stem lying down; leaves with five to seven pairs of inversely egg-oblong, smoothish leaflets; flowers, in May and June, green; spikes globose; propagated by division or by seed in common garden earth. *Ancistrum humile*, Persoon; *Ano. lævigatum*, Lagasca.—D. C. Sp. 11.

13. Silvery Thorn Wort (*A. argentea*, Ruiz). An evergreen hardy perennial, two feet in length, from Chili in 1822: leaves with three to four pairs of egg-oblong leaflets, silky beneath; flowers, in May and June, green, in globose spikes; calyx velvety outside; propagated by division or by seed in sandy peat. — *Ancistrum argenteum*, Humboldt. —R. et Pav. Fl. Per., I. p. 67, T. 103, f. 6. D. C. 10.

14. Round-spiked Thorn Wort (*A. cylindristachya*, Ruiz). An evergreen hardy perennial, six inches high, from Peru, on the cold hills of Tarma: stem demersed; leaves with ten to eleven pairs of oblong leaflets, silky beneath; spikes cylindrical; calyx four-bristled; propagated by division or by seed in sand, peat, and loam.—R. et P. Fl. Per., I. p. 68, T. 104, f. 2. D. C. Sp. 10.

15. Smooth Thorn Wort (*A. lævigata*, Aiton). An evergreen hardy perennial, six inches high, from the Straits of Magellan in 1790: stem lying down; leaflets oval, deeply nicked, smooth above, hoary below; flowers, from June to August, green; terminal spikes cylindrical, the lower ones globose; propagated by seed or by division in sandy peat.

16. Lucid Thorn Wort (*A. lucida*, Vahl). An evergreen frame perennial, six inches high, from the Falkland Islands in 1777: leaves with eight to nine pairs of leaflets, three to five-parted, velvety beneath, the segments line-like; flowers, in May and June, green; spikes egg-oblong; calyx four-bristled; propagated by division in sandy peat.—D. C. Sp. 15.

[A. c.]

ACALYPHA, Willdenow (from 'ακαλος, "unpleasant," and 'αφη, "touch"). Nettle Wort. *Monœcia Monadelphia*, Linnæus; *Euphorbiaceæ*, Jussieu. Male and female flowers on the same spike, or on two distinct spikes of the same plant; rarely dicœcious. Male flowers with a three to four-parted calyx; no corolla; six to sixteen stamens; female flowers with a three-leaved persistent calyx; no corolla; pistils three, many-cut; capsule with three cells, and one seed in each. —Spreng. Syst. Veg., vol. 3, p. 879.

1. A. virginica. 2. A. caroliniana. 3. A. ciliata. 4. A. indica. 5. A. virgata.

I.

MALE AND FEMALE FLOWERS ON THE SAME SPIKE.

1. *Plants, shrubby.*

1. Austral Nettle Wort (*A. Australis*, Linnæus). A native of Brazil: spikes axillary, solitary; calyx female flower round, entire; leaves oblong, rather blunt at the tip, saw-toothed, shining. *A. prunifolia*, Nees, Martius. . .

2. Birch Nettle Wort (*A. betulina*, Ritzius). A shrub of the East Indies and Arabia: spikes axillary; calyx heart-shaped, toothed; leaves smooth, rather rhomboid, blunt toothed, entire at the base. *A. fruticosa*, Forskal.

3. Two-bristled Nettle Wort (*A. bisetosa*, Bertero). A shrub of Porto Rico: spikes axillary; leaves egg-oblong,

heart-shaped, acute, nicked-toothed, and smooth on both sides.

4. Coloured Nettle Wort (*A. colorata*, Sprengel). A shrub of the East Indies: spikes axillary; leaves smooth, egg-lance-shaped, blunt, nearly entire, leathery, and red-margined. *Fragia colorata*, Poiret.

5. Cuspidate Nettle Wort (*A. cuspidata*, Jacquin). An evergreen bark-stove perennial, four feet high, from the Caraccas in 1819: male axillary, female spikes at the base; fence none; leaves egg-oblong-heart-shaped, tapering to a point, saw-toothed; flowers, in June and July, green; propagated by cuttings in common soil.—Vahl, Symb. I. T. 20.

6. Margined Nettle Wort (*A. marginata*, Sprengel). A shrub of the East Indies: spikes axillary; leaves egg-oblong-lance-shaped, longish, margined with white down. *Fragia marginata*, Poiret.

2. *Herbs.*

7. Short-spiked Nettle Wort (*A. brachystachya*, Willdenow). An annual, two-feet high, from China in 1816: female flowers at the base of the male spine without any fence; leaves roundish, egg-oblong, somewhat heart-shaped, saw-toothed; flowers, from July to August, green; propagated by seeds in common soil.

8. Carolina Nettle Wort (*A. Caroliniana*, Walter). An annual, two feet high, from North America in 1811; female flowers at the base of the male spike; fence heart-shaped, toothed; leaves somewhat rhomboid, egg-oblong, saw-toothed, entire at the base; flowers, from July till August, green; propagated by seed in common soil.—Lam. Ill. T. 789, f. 2.

9. Fringed Nettle Wort (*A. ciliata*, Forskal). A bark-stove annual, from the East Indies in 1799; spikes axillary; male spikes upwards, female spikes downwards; fence heart-shaped, tapering to a point with tiled saw-teeth, fringed; flowers, in July and August, green; propagated by seed in common soil.—Spreng. Sp. 9.

10. Heart-shaped Nettle Wort (*A. cordata*, Thunberg). A plant of the Cape of Good Hope: calyx three to four-parted, unequally; leaves distant, on stalks, heart-shaped, egg-oblong, toothed; flowers in axillary clusters.

11. St. Domingo Nettle Wort (*A. Domingensis*, Sprengel). A plant of Hispaniola: spikes axillary; calyx five-parted; leaves shorter than the leaf-stalks, lance-shaped, toothed, very smooth. *Fragia filiformis*, Poiret.—Spreng. Sp. 18.

12. Twin Nettle Wort (*A. gemina*, Sprengel). A plant of Cochin China: calyx heart-shaped; leaves egg-oblong-lance-shaped, toothed, smooth; flowers solitary, axillary.

13. Hispid Nettle Wort (*A. hispida*, Willdenow). A bark-stove annual, three-feet high, from the East Indies: spikes axillary; male spikes above, female spikes below; fence heart-shaped, hairy; leaves egg-oblong, pointed, hairy; flowers, from July till August, green; propagated by seeds in common soil.—Spreng. 14.

14. Indian Nettle Wort (*A. Indica*, Linnæus). A bark-stove annual, two feet high, from the East Indies in 1759: spikes axillary; male spikes above, female spikes below; fence smoothish, saw-toothed, wedge-shaped at the base; flowers, from July till September, green; propagated by seeds in common soil.—Rheed. Mal. x. T. 81. Spreng. Sp. 15.

15. Phleum-like Nettle Wort (*A. phleoides*, Cavanilles). A plant of New Spain: spikes solitary, terminal; calyx hood-shaped, three to five parted; leaves almost without foot-stalks, egg-oblong, toothed. *A. hirta, Var.* Cavanilles.

16. Poiret's Nettle Wort (*A. Poireti*, Sprengel). An annual of South America: spikes axillary, cylindrical, longish; female flowers numerous, green; calyx hood-shaped, nicked; leaves oblong, acute, toothed, and downy. *A. macrostachya*, Poiret.—Spreng. Sp. 6.

17. Plum-leaved Nettle Wort, (*A. prunifolia*, Kunth). A bark-stove annual, one foot high, from Mexico in 1825; flowers, from July till August, green; propagated by seeds in common soil.—Spreng. Sp. 12.

18. Creeping Nettle Wort (*A. reptans*, Swartz). An evergreen, bark-stove perennial, from Jamaica in 1820: flowers in July, green; propagated by seeds in common soil.—Sloan. T. 82. f. 3. Spreng. Sp. 17.

19. Red Nettle Wort (*A. rubra*, Willdenow). An evergreen, hothouse biennial, one foot and a half high, from the Mauritius in 1820: male spikes above, female spikes below; fence wedge-shaped, toothed at the edge; pistils many-cleft; leaves oblong, somewhat heart-shaped, saw-toothed; flowers, in July, red; propagated by seed in common soil.

20. Virginian Nettle Wort (*A. Virginica*, Linnæus). A hardy annual, two feet high, from North America in 1759: female flowers at the base of the male spike; fence egg-oblong, tapering to a point, toothed; leaves oblong, lance-shaped; flowers from July till August; propagated by seed sown in autumn in common soil.—Schrank, Hand. III., T. 311.

II.

SPIKES OF DISTINCT SEXES, THE MALE SPIKES TERMINAL.

1. *Trees.*

21. Tail Nettle Wort (*A. caudata*, Kunth). A tree of New Granada: leaves distant, egg-oblong, tapering to a point, toothed; spikes on very long flower-stalks; calyx hood-shaped, cut and toothed.—Spreng. Sp. 20.

22. Slender-spiked Nettle Wort (*A. leptostachya*, Kunth). A tree of New Granada: leaves egg-oblong, taper-pointed, nicked, saw-toothed, downy beneath; spikes slender; calyx cut, toothed.—Spreng. Sp. 25.

23. Long-leaved Nettle Wort (*A. machrophylla*, Kunth). A tree of Cumana: leaves distant, rather heart-shaped, egg-oblong, taper-pointed, grossly toothed, downy above; calyx hood-shaped, smoothish.—Spreng. Sp. 22.

24. Sida-leaved Nettle Wort (*A. sidæfolia*, Kunth). A tree of the banks of the river Magdalena: leaves heart-shaped, egg-oblong, taper-pointed, velvety beneath; calyx hood-shaped, cut, three-toothed.—Spreng. Sp. 23.

2. *Shrubs.*

25. Ancimia-like Nettle Wort (*A. ancimioides*, Kunth). A shrub of Mexico: leaves inversely egg-oblong, lobed, nicked at the tip, entire at the base; male spikes cylindrical, densely flowered; calyx of the female flower hood-shaped, toothed.—Spreng. Sp. 26.

26. Divers-leaved Nettle Wort (*A. diversifolia*, Jacquin). An evergreen, bark-stove, shrubby perennial, two feet high, from the Caraccas in 1820: female flowers twin, axillary; fences entire; leaves egg-oblong, tapering to a point, saw-toothed; flowers, from June till July, green; propagated by cuttings in common soil.—Spreng. Sp. 21.

27. Hernandia-leaved Nettle Wort (*A. hernandifolia*, Swartz). A shrub of Jamaica; leaves very distant, rather heart-shaped, egg-oblong, taper-pointed, saw-toothed, smooth, spikes thread-shaped; calyx heart-shaped, toothed.

28. Tickling Nettle Wort (*A. pruriens*, Nees Von Esenbeck). A native of Brazil: male spikes terminal, solitary; female axillary; calyx two-flowered, round, toothed, leaves rhomboid-egg-oblong, blunt, saw-toothed, fringed, hairy.

29. Sessile Nettle Wort (*A. sessilis*, Poiret). Native country unknown: leaves without foot-stalks, oblong-lance-shaped, blunt, entire, smooth; spikes rather short; calyx of the female flower toothed, downy.—Spreng. Sp. 28.

30. Velvety Nettle Wort (*A. villosa*, Linnæus). A shrub of New Granada and Hispaniola: leaves rather heart-oblong, taper-pointed, nicked and velvety; spikes thread-shaped; calyx of the female flower toothed, very velvety. *A. alnifolia*, Poiret?—Spreng. Sp. 27.

3. *Herbs.*

31. Corchorus-leaved Nettle Wort (*A. corchorifolia*, Willdenow). A plant of Martinico: leaves egg-oblong, heart-shaped, blunt, nicked, downy; female flowers axillary, without foot-stalks; calyx heart-shaped, toothed, hairy; branches diffuse, hairy.—Spreng. Sp. 30.

32. Lance-leaved Nettle Wort (*A. lanceolata*, Sprengel). A plant of the East Indies and Ceylon: leaves oblong-lance-shaped, thinnest at each end, saw-toothed; female spikes axillary; calyx heart-shaped, toothed.—Spreng. Sp. 31.

33. One-spiked Nettle Wort (*A. monostachya*, Cavanilles). A plant of Mexico; leaves round, nicked; male spikes solitary; female flowers axillary, without foot-stalks; calyx toothed.—Spreng. Sp. 29.

III.

Spikes of distinct sexes, the female spikes terminal.

1. *Shrubs.*

34. Narrow-leaved Nettle Wort (*A. angustifolia*, Swartz). A native of Hispaniola: leaves line-like, spear-shaped, grossly saw-toothed, downy; calyx rather round, saw-toothed.

35. Headed Nettle Wort (*A. capitata*, Willdenow). A shrub of the East Indies; leaves egg-oblong, blunt, saw-toothed, rather velvety beneath; female flowers somewhat headed; calyx toothed; male-spikes thread-shaped.

36. Carpinus-leaved Nettle Wort (*A. carpinifolia*, Poiret). A native of Hispaniola; leaves oblong, acute, saw-toothed, smooth; male spikes thread-shaped, female spikes solitary, longish; calyx about ten-parted, spreading.—Spreng. Sp. 46.

37. Carthagena Nettle Wort (*A. Carthaginensis*). Jacquin). A shrub of the banks of the river Magdalena; leaves egg-oblong-lance-shaped, saw-toothed, smooth; calyx rather heart-shaped, taper-pointed, toothed; stem producing runners and twigs.—Spreng. Sp. 43.

38. Corensian Nettle Wort (*A. Corensis*, Jacquin). A native shrub of the East Indies: leaves inversely egg-oblong, smooth, glandular, saw-toothed; spikes slender; calyx of the female flowers three-leaved.—Spreng. Sp. 41.

39. Smooth Nettle Wort (*A. lævigata*, Swartz). A bark-stove plant, three feet high, from Jamaica in 1819: flowers from June till July, green; propagated by cuttings in common soil.

40. Cottony Nettle Wort (*A. tomentosa*, Schwartz). A shrub of Hispaniola: leaves egg-oblong-lance-shaped, blunt, nicked, wrinkled, rather hairy; calyx many-parted; pistils very long, capillary, many cut.—Spreng. Sp. 45.

2. *Herbs.*

41. Fox-tail Nettle Wort (*A. alopecuroides*, Jacquin). A hardy annual, two feet high, from Venezuela in 1804: female spikes cylindrical, solitary at the top of the branches; fence three-parted, awned, fringed; leaves roundish, egg-oblong, and sharp-pointed; flowers from July till August, green; propagated by seeds in common soil.—Jacq. Icon. III. Tab. 620.—Spreng. Sp. 48.

42. Awned Nettle Wort (*A. aristata*, Kunth). A plant of the banks of the river Magdalena: leaves egg-oblong, taper-pointed, nicked, saw-toothed, rather hairy; calyx five-parted; awned, glandular, hairy. *A. hystrix*, Balbis.—Spreng. Sp. 49.

43. Slender Nettle Wort (*A. graciles*, Sprengel). A native of Rio Grande; leaves egg-oblong-lance-shaped, saw-toothed, ribbed, smooth; male-spikes thread-shaped; female spikes terminal, aggregate; no calyx.

44. Hairy Nettle Wort (*A. hirta*, Sprengel). A native of Rio Grande: leaves egg-oblong, equally saw-toothed, rather hairy; stem and leaf-stalks also hairy; male-spikes thread-shaped; female spikes terminal, solitary, no calyx.

45. Soft Nettle Wort (*A. mollis*, Kunth). A bark-stove annual, one foot high, from Mexico in 1825: flowers from July till August, green; propagated by seeds in common soil.—Spreng. Sp. 52.

46. Ocinus-like Nettle Wort (*A. ocinoides*, Kunth). A native of New Spain: leaves egg-oblong-heart-shaped, nicked, saw-toothed, downy; female spikes aggregate; calyx five-parted, glandular, fringed.—Spreng. Sp. 51.

47. Many-spiked Nettle Wort (*A. polystachya*, Jacquin). A bark-stove annual, one foot high, from the West Indies in 1817; flowers from July till August, green; propagated by seed in common soil.—Jacq. Scœn. II. T. 246. Spreng. Sp. 50.

IV.

Spikes of distinct sexes, both male and female; spikes not terminal but axillary.

1.

48. Elliptical-leaved Nettle Wort (*A. elliptica*, Swartz). A native of Jamaica: leaves egg-oblong-elliptic, taper-pointed, nicked, saw-toothed, smooth; spikes thread-shaped, loose; calyx of the female flower egg-oblong, toothed, hairy.

49. Smoothish Nettle Wort (*A. glabrata*, Thunberg). A native of the Cape of Good Hope: leaves egg-oblong, acute, saw-toothed, smoothish; spikes cylindrical.—Spreng. Sp. 37.

50. Very hairy Nettle Wort (*A. hirsutissima*, Willdenow). A native of Caraccas: leaves egg-oblong, taper-pointed, saw-toothed; branches and leaf-stalks very hairy; calyx wedge-shaped, toothed, very hairy.—Spreng. Sp. 36.

51. Long-spiked Nettle Wort (*A. macrostachya*, Jacquin). An evergreen frame perennial, three feet high, from Caraccas in 1824: flowers, from June till July, green; propagated by cuttings in common soil.—Jacq.; Schoen. II., T. 143. Spreng. Sp. 35.

52. Wandering Nettle Wort (*A. vagans*, Cavanilles). A native of Mexico: leaves distant, oblong, acute, saw-toothed, fringed; calyx heart-shaped, taper-pointed, toothed, fringed.—Spreng. Sp. 34.

53. Twiggy Nettle Wort (*A. virgata*, Willdenow). An evergreen, bark-stove, perennial, six feet high, from Jamaica in 1820: spikes axillary, erect; female spikes with the fences heart-shaped, toothed, very large; leaves egg-oblong, lance-shaped, saw-toothed, smooth; flowers, in June and July, green; propagated by cuttings in common soil.—Brown, Jam. T. 36, f. 2. Spreng. Sp. 33.

2. *Shrubs.*

54. Alder-leaved Nettle Wort (*A. alnifolia*, Willdenow). A native of the East Indies: leaves egg-oblong, rather blunt, nicked, downy; branches velvety; male spikes thread-shaped, female spikes interrupted; calyx toothed, hairy.

55. Birch-leaved Nettle Wort (*A. betulæfolia*, Swartz). A native of Jamaica: leaves roundish, nicked, smooth; male spikes solitary; female flowers axillary, solitary; calyx nicked, smooth.—Spreng. Sp. 55.

56. Thread-spiked Nettle Wort (*A. filiformis*, Poiret). A native of the East Indies (?): leaves egg-oblong, acute, toothed, fringed; branches and leaf-stalks downy; male spikes longish, thread-shaped.—Spreng. Sp. 58.

57. Entire-leaved Nettle Wort (*A. integrifolia*, Willdenow). A bark-stove perennial, five feet high, from the Mauritius in 1823: flowers dicecious; male flowers in spikes; female flowers axillary; fence roundish, entire; leaves smooth, lance-shaped, somewhat heart-shaped; flowers, from July till September, green; propagated by cuttings in common soil.—Spreng. Sp. 56. [A. c.]

ACANTHACEÆ, Jussieu (*Justicia* tribe). An order belonging to the *Corolliflorœ* of De Candolle, or *Hypocorollæ* of Jussieu, and forming the entire *Nixus Acanthales* of Lindley. Shrubs or herbaceous plants common in the tropics, and very rarely found beyond them. The leaves are invariably opposite, and without stipules; flowers imbricated; calyx permanent, five-four divided, rarely either many-cleft or entire and indistinct; corolla

monopetalous, hypogynous, mostly irregular, soon falling off; stamens inserted on the tube of the corolla, usually only two, but sometimes there are two or three additional shorter ones, of which one, and sometimes all, are without anthers; ovary with two cells and at least two ovules in each, and a single pistil; capsule also two-celled, with two or more seeds in each cell, rarely one-celled and one-seeded from abortion; seeds wingless, without albumen, and usually subtended by hooked prickle-like processes from the placenta, by which this order may be distinguished from those allied to it. It contains numerous genera, as *Acanthus*, *Justicia*, *Ruellia*, *Thunbergia*, &c.; their general properties are scarcely known: *Acanthus mollis* is considered emollient. Several species of *Justicia* yield a bitter extract, and are valued as tonics. [K. A.]

ACANTHALES, Lindley. A Nixus belonging to the *Monopetalæ* and cohort *Personatæ*. It is distinguished by the seeds having hooked processes below them, and being destitute of albumen. It contains only the order *Acanthaceæ*. [K. A.]

ACANTHOPHORA, Lamouroux (from the Greek, ἄκανθα, "a thorn," and φορος, "bearing"). Thorn Wrack. *Cryptogamia Algæ*, Linnæus; *Fucoideæ*, Jussieu. Tubercles thorny, thorns like glass, hairy, very much branched; colour of the dried plants greenish or whitish violet, sometimes tinged with yellow or red.

1. Thierry's Thorn Wrack (*A. communis*). An elegant annual of the tropical seas: stem cylindrical, thread-like; branches longish, with sparse tubercles upon the whole plant. —Lamour., Tab. 30, 31, f. 1.

2. Military Thorn Wrack (*A. militaris*, Lamouroux). An elegant annual of the tropical seas: tubercles in form of thorny masses.—Lamour., Tab. 4, f. 4, 6.

3. Delile's Thorn Wrack (*A. nayadiformis*, Delile). An elegant annual of the tropical seas: tubercles less numerous than in *A. communis*; branchlets in a close panicle. [G. L.]

ACANTHUS, Pliny (from the Greek, ἄκανθα, "a thorn"). Bear's Breech. *Didynamia Angiospermia*, Linnæus; *Acanthaceæ*, Jussieu. Calyx unequally four-parted, with three flower-scales, the middle one toothed and thorny; corolla lipped, and the opening closed with hairs; lower lip three-lobed; anthers velvety; pistil with a cleft summit; seed-vessel egg-oblong; the cells with one or two seeds.

1. Thistle Bear's Breech (*A. carduifolius*, Thunberg). An ornamental, evergreen, greenhouse perennial, one foot high, from the Cape of Good Hope in 1816: leaves wavy, toothed, very thorny; flowers, from July till September, blue; spike from the root; propagated by seed in peaty loam.

2. Spanish Bear's Breech (*A. Hispanicus*, Hortorum). An ornamental perennial, two feet high, from Spain in 1700: flowers, in July and September, white; propagated by division of the plant in common soil.

3. Holly Bear's Breech (*A. ilicifolius*, Linnæus). An ornamental, evergreen, bark-stove perennial, from the East Indies in 1759: leaves lightly waved on the edges, thorny-toothed; stem shrubby, prickly; propagated by division of the plant in common soil.—Rheed. Mal. II., T. 48.

4. Soft Bear's Breech (*A. mollis*, Linnæus). An ornamental perennial, three feet high, from Italy in 1548: leaves wavy, without thorns or prickles; flowers, from July till September, pale yellow; propagated by division of the plant in common soil.—Lam. Ill. T. 550.

5. Black Bear's Breech (*A. niger*, Miller). An ornamental perennial, from Portugal in 1759: leaves wavy, without thorns or prickles, smooth, shining green; flowers, from July till September, pale white; propagated by division of the plant in common soil.

6. Thorny Bear's Breech (*A. spinosissimus*, Persoon). An ornamental perennial, three feet high, from the south of Europe in 1629: leaves slashed, wing-cleft, blistered, thorny; thorns white; flowers, from July till September, pale white; propagated by division of the plant in common soil.

7. Prickly Bear's Breech (*A. spinosus*, Linnæus). An ornamental perennial, three feet high, from Italy in 1629: leaves wing-cleft, prickly; flowers, from July till September, pale white; propagated by division of the plant in common soil.—Bot. Mag., T. 1808. [G. L.]

ACARNA, Allioni (from the Greek, ἄκαρνα, "a sort of thistle"). Thistle Wort. *Syngenesia Æqualis*, Linnæus; *Compositæ Carduaceæ*, Jussieu. Receptacle chaffy; seed-down feathery; fence of flower-scales, tiled with scalelets; flowers with florets.

1. Netted Thistle Wort (*A. cancellata*, Willdenow). An annual, six inches high, from the south of Europe in 1640: stem branched; leaves lance-shaped, fringed, toothed, downy; outer leaves of the fence bristle-like, wing-cleft, conjoined at the base, and larger than the flower; flowers, in June and July, brown: propagated by seeds in common soil. *Atractylis cancellata*, Lin.

2. Tufted Thistle Wort (*A. comosa*, Sprengel). A hardy perennial, from Palestine in 1827: flowers, in July and August, purple.

3. Gum-bearing Thistle Wort (*A. gummifera*, Willdenow). A perennial, nine inches high, from the south of Europe in 1640: stemless; leaves wing-cleft; outer leaves of the fence three-pointed; flowers, from June till August, purple; propagated by divisions in common soil.

4. Saw-like Thistle Wort (*A. serratuloides*, Sprengel). A hardy perennial, from Palestine in 1827; flowers, in July and August, blue. [G. L.]

ACARUS, Linnæus. The mite, a genus of insects, of which the cheese-mite is the best known. What is termed the red spider (*Gamasus telarius*, Fabricius), was formerly arranged under *Acarus*.

ACAULIS (from the Greek, ἀ, "without," and καυλος, "a stem"). Stemless.

ACCENTS. It has been common in botanical works printed in England, to accent the Latin names of plants for the ostensible purpose of guiding the less learned to pronounce those names. This object, however trivial and useless as it must be in all cases, is seldom attained; and the accents being for the most part incorrectly printed, mislead instead of directing. The mistake, for instance, of *Veronica* for *Verónica*, in all the editions of Withering's British Plants; and the correct, but harsh one, of *Anemóne*, which would certainly be better, as in English *Anémone*, afford good objections, were there no other, to the practice. No botanical work, published on the Continent, so far as we know, is disfigured with the pedantry of accents. The best rule, indeed, for reading Latin botanical names, is to pronounce every letter, and to accent the word as if it were English. [B. E.]

ACCESSORY. This is applied when additional parts occur above the usual number. [B. E.]

ACCIOSA. A plant of which they make tea in Chili and Paraguay, but its botanical characters have not been determined. [O. B.]

ACCLIMATATION OF PLANTS. This term has been applied to the act of accustoming plants to support a temperature or a climate different from that in which they are found originally growing. This differs from *naturalization*, which is the act of transporting or transferring a plant into a country different from its native place of growth. Nobody can deny the possibility of these naturalizations; but there are some doubts upon the acclimatations of plants; doubts which have been corroborated by M. Schubler (*Linnæa*, 1829, p. 16) in a distinguished manner, and rendering this important question the more deserving of examination, that the facts which are reported are complex and somewhat contradictory.

On the one hand, we see wild plants appear fixed within the same climate from the epoch of which we could have any knowledge, in the instance of cultivated trees, such as the olive, that has for many centuries kept within the same limit.

From a great multiplicity of similar facts, we are led to the conclusion that each species can only support a degree of temperature, determined by contexture; and hence it would appear to follow that any alleged acclimatation is impossible.

On the other hand, we see certain trees, such as the horse-chestnut, which, although originally from the tropics, have reached as far north as Sweden. We see that in gardening, the *Aucuba Japonica* and the *Pæonia Moutan*, after having been cultivated in the hothouse, have passed into the greenhouse, and now flourish in the open air. But before we infer from these facts the possibility of acclimatation, it will be necessary to analyse them more fully.

Taking the instance of a plant which may have been placed at the first in the hothouse, and afterwards cultivated in the open ground, what are we to conclude, but that while ignorant of its nature, and while its rarity rendered it more precious, we were unwilling to run the risk of losing it. There is not a gardener, or one who has had the management of a botanic garden, who has not made such calculation a hundred times, and who, doubtful of success, has been led to follow this prudent course with a multitude of plants. Those plants which are received from tropical countries are usually thus treated, on the supposition that they partake of the general nature of plants brought from those countries; and we afterwards try, by groping in the dark, those which form exceptions to the general law. We thus succeed in naturalising some of them; but this does not yet prove that they have been acclimated, for they have not been exposed on their arrival in the climate they are afterwards seen to support. Even had this been done, the experiment would have been frequently doubtful; for when plants arrive in Europe they are for the most part weak and too young to try the experiment with; while every one knows that young plants, such as those of the bead tree, and the silk tree, will thrive in a temperate climate in their adult age, if they are very vigorous when planted, but which are easily destroyed by the frost when young.

An exact knowledge of the manner of living of each species tends to explain some of the illusions which we are apt to fall into on this subject. Thus, when a plant newly arrived in Europe, and consequently little known, is cultivated in the open ground, it often happens that it is placed in a soil or a position contrary to its nature, that it is watered too much or too little, and that it is pruned unseasonably, and the like; it consequently perishes without the temperature of the climate being to blame. Some years afterwards its nature becomes better known, and the management which it requires; it is planted anew in the open ground, is properly cultivated, and it succeeds, and we then say it is acclimated, while it is simply naturalised.

The greater number of cultivators think that plants, produced from seeds collected in the same country, are much stronger than those produced from foreign seeds, and make this an argument to prove the doctrine of acclimatation. Sir Joseph Banks (*Trans. Hort. Soc.*, i. 21) in particular adduces, in favour of this opinion, the culture of *Zizania aquatica*, established by him at Spring Grove; but he also relates that the first seeds collected in England produced delicate plants, and the second strong plants, so that this example proves as much against as in favour of the theory. Dr. Macculloch, also, (*Journ. of Science*, 1825, p. 20; *Feruss. Bull., Sc. Agr.*, 9, p. 262), in his Essay on the Island of Guernsey, strongly doubts this pretended superiority of plants coming from seeds. We will not stop to notice that this opinion is in opposition to the very generally received idea, that the changing of seeds is useful. We do not think it less probable that those seeds taken from trees supposed to be languishing, in consequence of not being yet properly acclimated, produce young plants much stronger than those which are taken from trees, more healthy, and growing in their natal soil. We will not discuss that which certain cultivators, such as M. J. Street (*Trans. Hort. Soc.*, viii. 1; *Ferussac, Bull., Agr.*), assert that the individual plants coming from cuttings are much stronger than those coming from seeds; but we will ask whether this experiment has been made with any degree of certainty; that is to say, in a comparative manner; and when the fact is so, that native seeds have had better success, whether this may not have arisen from the circumstance that certain sorts of seeds do not succeed well when they are not sown immediately after maturity, as in the case of the coffee plant, or perhaps from there being a greater number of seeds to dispose of, and more of them sown. In fine, supposing that experiments are in accordance with the admitted opinion, does this prove any thing more than that a tree which produces good seed is of a nature to accommodate itself to the soil, and is not this rather a proof of naturalisation than of acclimatation? Let us see if there exist any clearer proofs of the reality of acclimatation.

One of the principal results of culture, is the formation of varieties which otherwise would have no existence in nature, and which have different degrees of susceptibility according to the temperature. We know that these

varieties, in many instances, are much more delicate than the wild species. We may instance the varieties of double flowers, which are less hardy than those of single varieties of the same species; varieties of white flowers, which are generally less hardy than red or yellow varieties; and the varieties of the oleander, with double rose-red flowers, and with single white flowers, are often killed by the frost, while the common oleander, with single rose-red flowers, may stand the winter.

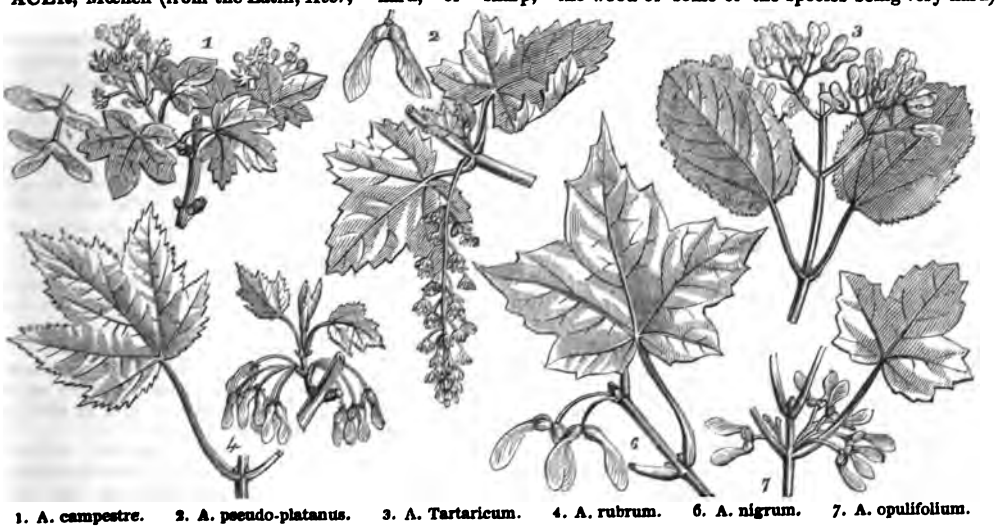
It is, however, those species produced by culture, and chiefly by hybridising, which are of a more hardy nature than the wild species. Now we conceive that the choice of these varieties affords the means of introducing certain sorts into climates where the original species could not have succeeded. This effect is most apparent in such varieties as have undergone some change in the season of vegetation: thus the late variety of the walnut tree, which we call St. John's walnut, will thrive in those localities where the frosts are felt late in the spring, and where the common walnut tree is soon killed by the cold. Thus the very early varieties of the vine will bear fruit in certain climates, where, either from there being little heat, or from the rapid approach of autumnal frosts, other varieties would not succeed.

There exists, in many species of plants, the remarkable phenomenon of certain individuals being more early or more late than others, without our being able to attribute the circumstance to the influence of locality; while at the same time we cannot perceive any sensible difference in the organisation. Now, by carefully collecting the seeds, or the layers, or the tubercles, or grafts, of such early and late varieties, we obtain artificially such agricultural sorts or varieties as present certain useful qualities, and such, in particular, as will thrive in climates where the original species would not succeed. For example, by gathering the tubers of such potatoes as ripen first, and by repeating the same, many times in succession, we may by this means obtain a variety which will ripen in three months. To us, such a variety is of no more advantage than in giving us an early vegetable; but if cultivated in climates farther north, it might introduce the useful culture of the potato in places where this was previously unknown. Attentive observation of such species and varieties may furnish means of advancing the culture of certain vegetables beyond their ordinary limits. For example, if the varieties of the olive brought from the Crimea, which appear less affected with cold than our European varieties, should come to be introduced on the shores of the Mediterranean; or if we should propagate extensively the variety called *Caillou* in Provence, which seems to stand eleven or twelve degrees (*Desnuchels, Bull. Sc. Agr.* 12, p. 344), we might be led to conclude that the olive is accustomed to a greater degree of cold, although there might only be the substitution of a hardier sort for a more delicate one.

In fine, although we are not authorised to observe that the vegetable tissue cannot, by the effects of habit, accustom itself to a different temperature than that of its native climate; and although we are disposed to recognise, in many cases, this influence of habit, yet the preceding facts seem to lead to the following inferences: 1st. That if certain species of vegetables are susceptible of being acclimated, this occurs within very narrow limits; and we frequently exaggerate these limits by confounding acclimatation with naturalisation. 2d. That the cases in which acclimatation appears to take place in reality, chiefly, if not exclusively, comprise species where there is a formation of new varieties, or where we have managed to change the season of the vegetation of plants, as arising from periodicity. 3d. That practical results, almost as important as those of acclimatation, more properly so called, are obtained by ably following up certain processes of culture. (See CLIMATE.) [F. D.]

ACCOUNT. (See FARM ACCOUNT.)

ACER, Mœnch (from the Latin, *Acer*, "hard," or "sharp," the wood of some of the species being very hard).



1. A. campestre. 2. A. pseudo-platanus. 3. A. Tartaricum. 4. A. rubrum. 6. A. nigrum. 7. A. opulifolium.

Maple. *Polygamia Monœcia*, Linnæus; *Acerineæ*, De Candolle. Calyx five-lobed, sometimes five-parted; stamens rarely five, commonly seven to nine; leaves simple, usually lobed.—De Cand. Prod. vol. i. p. 593.

I.

FLOWERS IN SPIKES.

1. *Leaves simple, never lobed.*

1. Oblong-leaved Maple (*A. oblongum*, Wallich). An evergreen, ornamental, frame tree, twenty feet high, from Nepaul in 1824: leaves oblong-spear-shaped, taper-pointed, smooth, rounded at the base; flowers, in February, greenish-white, in compound clusters; propagated by seed in common soil. *Acer laurifolium*, D. Don; *A. Busimpala*, Hamilton.—D. C. Sp. 1.

2. Tartarian Maple (*A. Tartaricum*, Linnæus). A hardy timber tree, twenty feet high, from Tartary in 1759: leaves heart-shaped, saw-toothed, with indistinct lobes; flowers, in May and June, greenish-yellow, in flattish, crowded, erect clusters; propagated by cuttings in common garden earth.—Den. Br. 160. D. C. Sp. 2.

2. *Leaves three-lobed, or three-cut, rarely five-lobed.*

3. Taper-pointed Maple (*A. acuminatum*, Wallich). A hardy tree, from Nepaul: leaves heart-shaped, three to five-lobed, smooth; lobes doubly-toothed, long taper-pointed; bundles few-flowered, upright, shorter than the leaves; partial flower-stalks nearly opposite, longish, smooth.—Spreng. Syst. vol. 4, part 2, p. 150.

4. Leather-leaved Maple (*A. coriaceum*, Bosc). A hardy tree, about twenty feet high; native country not known: leaves leathery, as long as broad, three to five-lobed, toothed, smooth; flowers in loose bundles; wings of the fruit erectly diverging.—Bosc.

5. Hybrid Maple (*A. hybridum*, Bosc). A hardy tree, twenty feet high, from North America in 1799: leaves somewhat heart-shaped, leathery, smooth, deeply three-cut; flowers, from May to June, greenish-yellow, in drooping clusters; propagated by layers in common garden soil.—Bot. Cab. 1221. D. C. Sp. 6.

6. Spike-flowered Maple (*A. spicatum*, Lamarck). A hardy tree, twenty feet high, from Canada and the Alleghany mountains in 1750: leaves heart-shaped, three or slightly five-lobed, taper-pointed, unequally or coarsely-toothed; flowers, in April and May, very small, greenish yellow, in compound, erect, clusters; keys, short, red in autumn; propagated by layers or seed, in sand and loam. *Acer montanum*, Miton; *A. Pennsylvanicum*, Du Roi; *A. parviflorum*, Ehrhart.—D. C. Sp. 4.

7. Streaked Maple, or Moose-wood (*A. striatum*, Lamarck). A hardy, ornamental tree, thirty feet high, from North America, in 1755: leaves heart-shaped, three-lobed, taper-pointed; flowers, in May and June, greenish-yellow, in simple, drooping clusters; keys short and blunt; trunk beautifully striped with white lines; propagated by layers, cuttings, or seed, in common garden earth. *Acer Pennsylvanicum*, Linnæus; *A. Canadense*, Du Hamel.—D. C. Sp. 3.

3. *Leaves five-lobed.*

8. Field Maple (*A. campestre*, Linnæus). A hardy, ornamental tree, about twenty feet high, native of Europe, in hedges and coppices, very common in Britain; leaves small, heart-shaped, with five-toothed lobes; flowers, from May to July, greenish, in erect clusters; fruit with the wings much divaricated; propagated by seed in common garden earth.—Eng. Bot. 304.—D. C. Sp. 8.

Var. a. A. Hebecarpum (De Candolle). Fruit with velvety down; *Acer campestre*, Wallroth; *A. molle*, Opiz.

Var. b. A. collinum (Wallich). A native of France: lobes of the leaves blunt; flowers smaller; fruit smooth. *A. affine*, and *A. macrocarpum*, Opiz.

Var. c. Austriacum, Trattinik, a native of Austria: lobes of the leaves somewhat taper-pointed; flowers larger; fruit smooth.—Tratt. Arch. 1, No. 6.

9. Tail-leaved Maple (*A. caudatum*, Wallich). A hardy tree, fifty feet high, from Nepaul: leaves heart-shaped, five-lobed, downy beneath, and velvety at the base of the leaf-ribs and riblets, but when old smooth; lobes egg-oblong, taper-pointed, and doubly-toothed; propagated by layers, cuttings, or seed, in common garden earth.—Wallich.

10. Long-leaved Maple (*A. macrophyllum*, Pursh). A hardy, ornamental tree, sixty feet high, from California in 1812: leaves with five finger-like lobes, and roundish recesses; lobes somewhat three-lobed; flowers, in May and June, greenish-yellow, in erect, flattish clusters; stamens nine; filaments and seed-organs hairy; propagated by layers or seed in common garden soil.—D. C. Sp. 7.

11. Sycamore Plane Tree (*A. Pseudo-Platanus*, Linnæus). A well-known ornamental timber tree, twenty to sixty feet high, from Mid-Europe in 1683: leaves heart-shaped, smooth, with five taper-pointed, unequally-toothed lobes; flowers, in April and May, yellowish-green, in drooping clusters, rather flattish; filaments hairy; fruit smooth, the wings rather diverging; propagated by seed in common garden soil.—Eng. Bot. 303. D. C. Sp. 5.

Var. a. subobtusum: lobes of the leaves more blunt; the fruit and wings larger. *Acer opulifolium*, Thuillier; *A. vitifolium*, Opiz.

Var. b. variegata, G. Don: leaves variegated.

Var. c. laciniatum: lobes of the leaves jagged. Schm. Arb. i. 5.

12. Sterculian Maple (*A. sterculiaceum*, Wallich). A hardy tree, fifty feet high, from Nepaul: leaves heart-shaped, covered with a spreading down beneath, five-lobed, lobes egg-oblong, taper-pointed, toothed, outer ones very short, and quite entire; flowers white, in lateral clusters; propagated by layers, cuttings, or seed, in common garden earth.—Wall. Pl. Rar. As. 2 p. 3, T. 105.

13. Velvet Maple (*A. villosum*, Wallich). A hardy tree, fifty feet high, from the high Alps near to the line of perpetual snow in Sirmore and Kamaon: leaves heart-shaped, five-lobed, the lobes egg-oblong, acute, velvety beneath; flowers fragrant, in lateral clusters; fruit velvety, with straightish, nicked wings, somewhat of the shape of a pruning knife; propagated by layers or cuttings in common garden earth.—Wall. Pl. Rar. As. 2, p. 4.

II.

FLOWERS IN CLUSTERS.

1. *Leaves simple.*

14. Smooth Maple (*A. lævigatum*, Wallich). A hardy tree, forty feet high, from Nepaul: leaves oblong, pointed, saw-toothed, smooth; flowers white, in terminal bunches; propagated by layers, cuttings, or seed, in common garden earth.—Wall. Pl. Rar. As. 2, p. 3, T. 104.

2 *Leaves three-lobed.*

15. Bearded Maple (*A. barbatum*, Michaux). A hardy timber tree, twenty feet high, from the moist pine-barrens of North America in 1812: leaves egg-oblong, somewhat heart-shaped, with three unequal toothed lobes; flowers greenish yellow; clusters without foot-stalks; calyx bearded on the inside; propagated by layers, cuttings, or seed, in sand and loam. *Acer Carolinianum.*—D. C. Sp. 17.

16. Criton Maple (*A. Creticum*, Linnæus). An evergreen, ornamental, shrub, four feet high, from the Grecian Archipelago in 1752: leaves wedge-shaped at the base, acutely three-lobed at the top; flowers, in May and June, greenish-yellow; bundles few-flowered, erect; fruit smooth, wings scarcely diverging; propagated by layers, cuttings, or seed, in common garden earth.—D. C. Sp. 13.

17. Variable-leaved Maple (*A. heterophyllum*, Willde-

now). An evergreen, ornamental shrub, four feet high, from the Levant in 1759: leaves small, dark-green, egg-oblong, entire, lobed, and indistinctly toothed; flowers, in May and June, greenish-yellow; propagated by layers, cuttings, or seed, in common garden earth. *Acer sempervirens*, Linnæus.—D. C. Sp. 16.

18. Iberian Maple (*A. Ibericum*, Bieberstein). A hardy tree, twenty feet high, from Georgia in Asia in 1826: leaves bluntly three-lobed; lobes having one to two teeth, lateral ones marked with the middle rib to the insertion of the leaf-stalk; leaf-stalk shorter than the leaves; flowers greenish-yellow; propagated by layers, cuttings, or seed, in common garden earth.—D. C. Sp. 15.

19. Montpelier Maple (*A. Monspessulanum*). A tree, sometimes a mere shrub, at other times twenty feet high, from the South of Europe in 1739: leaves heart-shaped, three-lobed; lobes nearly entire, equal; flowers, in May, greenish-yellow, bundles few-flowered, erect; fruit smooth, wings scarcely diverging; propagated by layers, cuttings, or seed, in common garden earth. *Acer trifolium*, Du Hamel.—D. C. Sp. 14.

20. Blunt-leaved Maple (*A. obtusifolium*, Sibthorp). A hardy, ornamental tree, fifteen feet high, from Crete: leaves rounded, bluntly three-lobed, nicked, toothed, and about the length of the leaf-stalk; flowers, in May and June, greenish-yellow, drooping; fruit smooth, with the wings parallel and lying close together; propagated by layers, cuttings, or seed, in common garden earth. *Acer Cretica*, Tournefort; Sibth. and Smith, Fl. Græc. T. 361.—D. C. Sp. 13.

21. Small-leaved Maple (*A. parvifolium*, Tansch). A stove, or hot-house shrub, twenty feet high, from the South of Europe: leaves somewhat five-lobed and three-lobed, bluntly-toothed; clusters many-flowered, nodding; propagated by layers, cuttings, or seed, in sand and loam.—Tansch.

3. *Leaves five-lobed, rarely seven-lobed.*

22. Round-leaved Maple (*A. circinatum*, Pursh). A beautiful hardy tree, fifty feet high, from California in 1827: leaves round, rather heart-shaped at the base, seven-lobed; lobes acutely-toothed; leaf-ribs and riblets hairy at their origin; flowers unknown.—D. C. Sp. 29.

23. Bill-hook Maple (*A. cultratum*, Wallich). A hardy tree, from Himalaya: leaves heart-shaped, seven-lobed; lobes taper-pointed, entire; bundles stalked; flowers rather umbelled; petals wedge-shaped; fruit with divaricate wings, like a bill-hook or pruning-knife; propagated by layers or seed, in common garden earth.—Wall. Pl. As. Rar. 2, p. 4.

24. White Maple (*A. eriocarpum*). A hardy timber-tree, forty feet high, from the banks of the rivers in North America in 1725: leaves abrupt at the base, smooth and grey beneath, five-lobed and hand-like, with blunt recesses, and unequally, deeply-toothed lobes; flowers, in April and May, greenish-yellow, in bundles, on short-stalks; no petals; five stamens; seed-organs downy; seed greenish-yellow; propagated by cuttings or seed in sand and loam. *Acer dasycarpum*, Willdenow; *A. tomentosum*, Hort. Bar.; *A. glaucum*, Marsh; *A. Virginianum*, Du Hamel.—D. C. Sp. 21.

25. Smooth Maple (*A. glabrum*, Torrey). A stove or hot-house tree, from the Rocky Mountains of North America: leaves smooth, roundish, five to seven-lobed, acutely-toothed; bundles stalked; fruit smooth; wings broad-egg-oblong, diverging.—Torrey.

26. Black Maple (*A. nigrum*, Michaux). A hardy timber tree, forty feet high, from the mountain lands in North America in 1812: leaves heart-shaped, with the recess closed, five-lobed, in form of a hand, downy beneath; flowers, in April and May, yellowish, in nodding, stalkless bundles; fruit smooth, wings diverging; propagated by seed in sandy peat.

27. Blunt-lobe-leaved Maple (*A. obtusatum*, Ketaibel). A hardy ornamental shrub, from Hungary and Croatia in 1825: leaves heart-shaped, roundish, five-lobed; lobes bluntish, wave-toothed; flowers, in May, greenish-yellow, in drooping bundles; fruit rather hairy; propagated by layers in loam.—Michaux, F. Arb. II., p. 238, T. 16.—D. C. Sp. 20. common garden soil.—Tratt. Arb. I. 14. D. C. Sp. 11.

28. Italian Maple (*A. Opulus*, Aiton). A beautiful hardy tree, twenty to fifty feet high, from Italy in 1752: leaves heart-shaped, roundish, five-lobed; lobes blunt, bluntly and coarsely-toothed; flowers, in May and June, yellowish, in upright, stalked bundles; seed-organs hairy; fruit smooth; propagated by layers, cuttings, or seed, in common garden earth. *Acer Italum*, Lauth; *A. rotundifolium*, Lamarck; *A. villosum*, Presl.—D. C. Sp. Sp. 9.

29. Guelder-Rose Maple (*A. opulifolium*, Villars). A hardy, ornamental shrub, eight feet high, from Valais and Catalina: leaves heart-shaped, roundish, five-lobed; lobes bluntly and coarsely-toothed; flowers, in May and June, greenish yellow, in bundles almost stalkless; seed-organ and fruit smooth; propagated by layers in common garden soil. *Acer Hispanicum*, Pourret; *A. vernum*, Reynier; *A. montanum*, C. Bauhin.—Tratt. Arb. I. 15. D. C. Sp. 10.

30. Palmate Maple (*A palmatum*, Thunberg). A hardy, ornamental tree, twenty feet high, from Japan in 1820: leaves smooth, divided into five to seven hand-like lobes beyond the middle; lobes oblong, taper-pointed, toothed; umbels five to seven-flowered; flowers, in May, yellowish-green; propagated by layers, cuttings, or seed, in common garden earth.—Tratt. Arb. I. 17. D. C. Sp. 9.

31. Plane-like, or Norway Maple (*A. platanoides*, Linnæus). A hardy timber tree, fifty feet high, from the South of Europe in 1683: leaves heart-shaped, smooth, five-lobed; lobes taper-pointed, with a few coarse acute teeth; flowers, in May and June, yellow, on stalked, rather erect bundles; fruit smooth; wings divaricated; propagated by layers, cuttings, or seed, in common garden earth. *Acer Lobelii*, Tenore.—D. C. Sp. 18.

Var. a. A. laciniatum, Aiton: lobes of the leaves deeply jagged, with taper-pointed, bristle-like teeth. *Acer crispum*, Lauth. *A. palmatum*, Trattinik.

32. Scarlet or Swamp Maple (*A. rubrum*, Linnæus). A hardy timber tree, twenty feet high, from the low woods of North America, introduced in 1656: leaves heart-shaped at the base, grey beneath, deeply and unequally toothed, five-lobed and handlike, with acute recesses; flowers, in April and May, red; petals five; stamens five; seed-organ smooth; seed red; branches red; propagated by layers, cuttings, or seed in sand and loam. *A. Virginianum*, Hermann; *A. Floridanum*, of the gardens.—D. C. Sp. 19.

33. Sugar Maple (*A. saccharinum*, Linnæus). A valuable timber tree, twenty to forty feet high, from North America in 1735: leaves heart-shaped, smooth, grey beneath, five-lobed, similar to a hand; lobes taper-pointed, wavedly toothed; flowers, in April and May, yellow, in compound drooping bundles on short flower-stalks; fruit smooth, wings diverging: propagated by seed, layers, or cuttings in sand and loam.—Mich. Arb. II. 15.—D. C. Sp. 19.

34. Seven-lobed Maple (*A. septemlobum*, Thunberg). A tree, forty feet high, from Japan: leaves smooth, seven-lobed; lobes taper-pointed, equally and acute-toothed; flowers in May.—D. C. Sp. 26.

35. Three-cleft-leaved Maple (*A. trifidum*, Thunberg). A hardy tree, about twenty feet high, of Japan: leaves undivided and three-cleft, entire; twigs smooth and purplish.

III.

FLOWERS IN STALKED UMBELS: SPECIES NOT SUFFICIENTLY KNOWN.

36. Dissected-leaved Maple (*A. dissectum*, Thunberg). A tree, thirty feet high, of Japan: leaves five to seven parted; lobes oblong, taper-pointed, deeply toothed or wing-cleft; flowers in May; umbels four to six-flowered; corolla small, red.—D. C. Sp. 23.

37. Japan Maple (*A. Japonicum*, Thunberg). A hardy

tree, twenty feet high, of Japan: leaves roundish, velvety, hand-like, many-cleft; lobes eleven to thirteen, taper-pointed, toothed; umbels many-flowered; flowers purple; fruit woolly.—D. C. Sp. 27.

38. Lobe-leaved Maple (*A. lobatum*, Fischer). A hardy, ornamental tree, from Siberia, in 1820? leaves seven-lobed; propagated by layers, cuttings, or seed, in common garden earth. A very doubtful species.

39. Painted-leaved Maple (*A. pictum*, Thunberg). A hardy tree, thirty feet high, from Japan: leaves smooth, hand-like, seven-lobed, lobes entire; leaves variegated with white; branches grey.—D. C. Sp. 27. [A. C.]

ACERALES, Lindley. A Nixus belonging to the *Polypetalæ*, and to the cohort *Calycosæ*. It is characterised by having few stamens, and unsymmetrical flowers. It contains five orders, *Acerineæ*, *Sapindaceæ*, *Hippocastaneæ*, *Polygaleæ*, and *Vochysiaceæ*.

ACERAS, R. Brown (from the Greek, ἀ, "without," and κέρας, "a horn"). Man Orchis. *Gynandria Monandria*, Linnæus; *Orchideæ*, Jussieu. Flower gaping (*ringent*); lip without a spur; glands of the stalks of the pollen masses contained in a common little pouch.

1. Green Man Orchis (*A. anthophora*, R. Brown). A tuberous-rooted perennial, one foot high, found in dry chalky pastures in the South-east of England; root tubers egg-oblong; leaves mostly near the root; flowers, in June, yellowish green, in a long spike; lip longer than the seed organ, three-parted; helmet green, consisting of three calyx leaves and two small petals; propagated with difficulty by seeds in dry chalky soil. *Ophrys anthoropophora*, Linn. Eng. Bot. 29. [B. E.]

ACERATES, Elliot. A genus formed for the species *Asclepias longifolia*.

ACERATIUM, De Candolle. Treflower. *Dodecandria Monogynia*, Linnæus; *Eleocarpeæ*, De Candolle. Calyx five-leaved; petals five, with the top fringed as if torn; the claw broad, and fringed with velvety down; anthers without terminal bristles; one pistil; seed unknown.

1. Opposite-leaved Treflower (*A. oppositifolium*, De Candolle). A stove shrub, from Amboyna in 1818: leaves opposite, elliptic, oblong, somewhat downy on the leaf-ribs, saw-toothed, the teeth rarely sword-pointed; flowers on three-flowered footstalks. [B. E.]

ACERINEÆ, Jussieu. Sycamore tribe. An order forming part of the *Thalamifloræ* of De Candolle, or *Hypopetalæ* of Jussieu; and of the Nixus *Acerales* of Lindley. Trees of temperate and northern latitudes: some are found in Nepaul, which seems to be their southern limit. Leaves opposite, simple or pinnated, and without stipules; flowers often polygamous; calyx usually five, or rarely four to nine-parted, with the divisions imbricated during æstivation; petals as many, and alternating, hypogynous, rarely wanting; stamens inserted round a hypogonous disk, definite, usually eight, sometimes five or twelve; ovary two-lobed, two-celled, with two erect ovules in each cell; pistil one, with two awl-shaped stigmas; fruit with two wings, indehiscent, two-celled, with one or two erect seeds in each cell; seeds with no albumen, a curved or convolute embryo, and leafy wrinkled cotyledons. The two-celled indehiscent fruit, with two wings, form the most prominent character by which, and by the petals being naked, or not furnished with appendages on the inside, it is distinguished from the other orders of this Nixus. The species of *Acer*, particularly *A. saccharinum*, contain much juice between the bark and the wood, which, when collected and evaporated, forms sugar, in much use in the back settlements of North America. Three genera are known, *Acer*, *Dolinæa*, and *Negundo*. [K. A.]

ACEROSE. Needle-pointed, as in the leaves of the common juniper. [B. E.]

ACESCENT. Becoming sour.

ACETATE OF POTASH. In vegetable physiology, a chemical compound termed a vegeto-mineral. It is indicated in Winter's bark, linseed, senna leaves, flowers of verbascum, ginger root (*rhizoma*), and some other plants. [F. D.]

ACETABULUM. In veterinary anatomy, the haunch socket, which receives the head of the thigh bone. In the horse this cavity has been fractured into several pieces by the animal being rashly alarmed and slipping his foot when making a spring forward in the stall. The symptoms are hanging of the extremity, inability to move it, or put the foot to the ground. Upon examining the cavity of the pelvis, by introducing the hand up the vent-gut (*rectum*), a breach of continuity is felt; and a crepitating, crackling noise is made when the limb is moved. No attempt need be made to remedy this accident, for the horse will either die of fever, or remain a cripple for life. [C. S.]

ACETABULIFORM. In form of the haunch socket, as in the reproductive organs of some lichens. [B. E.]

ACETARIOUS. Belonging to salads. Evelyn entitled his work on salads, *Acetaria*. [B. E.]

ACETIC ACID. The chemical term for pure vinegar, which when prepared by distilling vinegar is weaker than the crude acid; but when prepared by distilling wood it is much stronger, and is then termed pyroligneous acid.

ACETOSA. Sorrel. A genus united to *Rumex*.

ACETOSELLA. A division of the genus *Oxalis*.

ACETOUS. Sourish, or somewhat acid. The acetous fermentation of liquids containing vegetable substances is the chemical process from which vinegar results. [B. E.]

ACHANIA, Linnæus. A genus of plants now arranged under *Malaviscus*. [B. E.]

ACHENIUM. A simple pip, or fruit which is hard, dry, one-seeded, one-celled, and indehiscent, as in thistle and sunflower. A compound pip, as in borage, is termed *Polachenium*. [B. E.]

ACHILLEA, Linnæus (named from the Greek physician Achilles). Milfoil. *Syngenesia Superflua*, Linnæus; *Compositæ Anthemideæ*, Jussieu. Calyx-fence egg-oblong, tiled, unequal; receptacle plane, chaffy; radiate flowers 5 to 10 without stamens, roundish, and inversely heart-shaped; seed oval.

ENTRANCE HALL
DATE 2/10/98
Please hand in slip to an enquiry point

I.

Leaves undivided.

. Sweet Maudlin Milfoil (*A. ageratum*, Linnæus). An amental, evergreen, hardy perennial, from the South of ope in 1570: leaves oblong, blunt, saw-toothed, nar- ed into the leaf-stalk, bundled, smooth, and shining; ers, in August and October, yellow, in bundles; propa- d by division in sandy peat.

. English Milfoil (*A. Anglica*, G. Don). An orna- tal, evergreen, hardy British perennial, two feet high: rs, in August and September, white; propagated by ion of the plant in common soil. *A. serrata*, Eng. 2531.

Double-sawed Milfoil (*A. biserrata*, Bieberstein). An nental, evergreen, hardy perennial, one foot and a half , from Albania in 1820: leaves line-like, lance-shaped, ing to a point, unequally and finely doubly saw-toothed, ety beneath; flowers, in June and July, white; propa- l by division of the plant in common soil.

Crested Milfoil (*A. cristata*, Retzius). An orna- tal, evergreen, hardy perennial, six inches high, from in 1784: leaves line-like, with a flat surface, tapering point, toothed; teeth fringed across; stem diffuse; rs, in July and August, white: propagated by division e plant in peaty loam.

Discolouring Milfoil (*A. discolorans*, Schrader). An nental, evergreen, hardy perennial, one foot high: leaves ike, tapering to point, equally and finely saw-toothed, eeth at the base deepest; flowers, from June till August, ish-yellow; propagated by division of the plant in com- soil.

. Large-flowered Milfoil (*A. grandiflora*, Bieberstein). ornamental, evergreen, hardy perennial, one foot high, from Caucasus in 1815: leaves line-like, pointed, equally and finely saw-toothed, smooth; stem panicled; flowers, in July and August, white; bundles with few heads; propagated by division of the plant in common soil.

7. French Milfoil (*A. herba-rota*, Allioni). An ornamental, evergreen, hardy perennial, six inches high, from France in 1640: leaves line-like, narrowed at the base, saw-toothed; stem smooth; flowers, in June and July, white; propagated by division of the plant in common soil.—Allioni, Ped. I. 9, 3.

8. Tongued Milfoil (*A. lingulata*, Kitaibel). An ornamental, evergreen, hardy perennial, one foot high, from Hungary in 1815: leaves oblong, line-like, blunt, doubly saw-toothed, downy, fringed; stem velvety, flowers, in July and August, white; propagated by division in common soil.—Waldstein I. 2.

9. Mongolian Milfoil (*A. Mongolica*, Fischer). An ornamental, evergreen, hardy perennial, one foot and a half high, from Siberia in 1818: flowers, in July and August, white; propagated by division in common soil.

. 10. Sneezewort Milfoil (*A. ptarmica*, Linnæus). An evergreen, common, British perennial, one foot high, found in moist places: leaves line-like, lance-shaped, tapering to a point, sharply saw-toothed; flowers, in July and August, white.—Eng. Bot. 751.

11. Showy Milfoil (*A. speciosa*, Henke). An ornamental, evergreen, hardy perennial, one foot and a half high, introduced in 1804: leaves lance-shaped, equally and finely saw-toothed, downy; saw-teeth of the base deepest; flowers, from July to September, white; propagated by division in common soil.

II.

Leaves wing-cut, or doubly or deeply toothed.

2. Alpine Milfoil (*A. Alpina*, Linnæus). An orna- tal, evergreen, hardy perennial, six inches high, from ria in 1731: leaves line-like, comb-toothed, wing-cleft, smooth; segments somewhat saw-toothed; flowers from July till November, white; bundle compound; propagated by division in sandy peat.—Boccone, Mus. 144, 101.

13. Asplenian Milfoil (*A. asplenifolia*, Ventenat). An ornamental, evergreen perennial, one foot and a half high, from North America in 1803: leaves wing-cleft, downy beneath; segments toothed; stem pyramidal smooth; flowers, from June till August; propagated by division of the plant in sandy peat.—Ven. Cels. 93.

14. Chamomile Milfoil (*A. chamæmelifolia*, Pourret). An ornamental, evergreen, hardy perennial, nine inches high, from France in 1825; flowers, in July, white; propagated by division in common soil.

15. Clavenna's Milfoil (*A. Clavennæ*, Linnæus). An ornamental, evergreen, hardy perennial, six inches high, from Austria in 1656: leaves downy, wing-cleft, smooth; segments line-like, blunt, the upper, toothed at end; flowers, in June and July, white; bundles simple; propagated by division in loam.—Bot. Mag. 1827.

16. Buckhorn Milfoil (*A. coronopifolia*, Willdenow). An ornamental, evergreen, hardy perennial, one foot and a half high, from the Levant in 1823: leaves downy, wing-cleft; segments lance-shaped, saw-toothed; flowers, in July and August, pale yellow; bundle compound; propagated by division in common soil.—Wild. Tr. Ach. I. 2.

17. Gerber's Milfoil (*A. Gerberi*, Willdenow). An ornamental, evergreen, hardy perennial, one foot and a half high, from Siberia in 1821: stem leaves wing-cleft, with entire segments; ray of the flowers scarcely longer than the calyx fence; flowers, in July and August, pale yellow; propagated by division in common soil.—Gmel. Sib. II. 83. 2.

18. Impatient Milfoil (*A. impatiens*, Linnæus). An ornamental, evergreen, hardy perennial, two feet high, from Siberia in 1759; leaves comb-toothed, wing-cleft, smooth; segments line-like, pointed, lower segments two-parted; flowers, from June to September, white; bundle simple; propagated by division in common soil.—Gmel. Sib. II. 81, 7.

19. Comb-leaved Milfoil (*A. pectinata*, Willdenow). An ornamental, evergreen, hardy perennial, one foot and a half high, from Hungary in 1801: leaves comb-toothed, doubly wing-cleft; segments line-like, somewhat awl-shaped, entire, stem downy; flowers, in August and September, pale yellow; bundle compound, contracted; propagated by division in common soil.—Wah. I. 34.

20. Bent-leaved Milfoil (*A. recurvifolia*, La Peyrouse). An ornamental, evergreen, hardy perennial, one foot and a half high, from the Pyrenees in 1820: leaves bent back; flowers, in July and August, white; propagated by division in common soil.

21. Saw-toothed Milfoil (*A. serrata*, Retzius). An ornamental, evergreen, hardy perennial, two feet high, from Switzerland in 1686: leaves downy, line-like, lance-shaped, wing-cleft; segments deepest at the base; flowers, in August and September, white: propagated by division of the plant in common soil.

22. Rough-headed Milfoil (*A. squarrosa*, Hort. Kew.). An ornamental, evergreen, hardy perennial, one foot high: leaves wing-cleft; segments oblong, wedge-shaped, unequally toothed, vertically bent; flowers, in July and August, white; bundles simple; propagated by division in peaty loam.

III.

LEAVES WINGED.

23. Egyptian Milfoil (*A. Ægyptiaca*, Linnæus). An ornamental, evergreen, greenhouse perennial, from the Levant in 1640: leaves winged; leafits lance-shaped, cut-saw-toothed; outer leafits confluent; bundle compound; flowers, from July till September, pale yellow; propagated by cuttings in peaty loam.—Tournef. Itin. I. 87.

24. Whitish Milfoil (*A. albida*, Willdenow). An ornamental, evergreen, hardy perennial, one foot high: stem downy; leaves winged, minutely cut, pointed, rigid, bent upwards, with a downy rib; flowers, in July, pale yellow; propagated by division in common soil.

25. Anthemidan Milfoil (*A. anthemoides*, Willdenow). An ornamental, evergreen, hardy perennial, six inches high: leaves winged, downy; leafits line-like, entire, blunt, the lowest longest; flowers from June till August; bouquet simple; propagated by division in common soil.

26. Black Milfoil (*A. atrata*, Linnæus). An ornamental, evergreen, hardy perennial, two feet high, from Austria in 1596: leaves comb-toothed, winged, smooth; leafits line-like, tapering to a point, usually three-parted; flowers, from July till September, white; propagated by division in common soil.—Jacq. Aust. I. 77.

27. Earlet Milfoil (*A. auriculata*, Willdenow). An ornamental perennial, one foot high, from Asia Minor in 1827: flowers, from June till August, yellow; propagated by division in common soil.

28. Cretan Milfoil (*A. Cretica*, Linnæus). An ornamental, evergreen, hardy perennial, one foot high, from Candia in 1739: leaves winged, downy; leafits roundish, four-cleft, concave, spreading; stem branched at the end; flowers, in July and August, white; propagated by division in peaty loam.—Boccone, Mus. 34.

29. Prostrate Milfoil (*A. decumbens*, Lamarck). An ornamental, evergreen, hardy perennial, six inches high, from Kamschatka in 1816; flowers, from June till August, yellow; propagated by division in sandy loam.

30. Sickle Milfoil (*A. falcata*, Linnæus). An ornamental, evergreen, hardy perennial, six inches high, from the Levant in 1739: leaves winged, roundish, hairy; leafits three-parted, toothed, tiled across; flowers, from June till September, pale yellow; bundles simple; propagated by division in common soil.—Lam. Illust. 683, 3.

31. Velvet Milfoil (*A. holosericea*, Smith). An ornamental, deciduous, hardy perennial, one foot and a half high, from Mount Parnassus in 1817: flowers, from July till September, white; propagated by division in common soil.

32. Tiled Milfoil (*A. imbricata*, Ventenat). An ornamental, evergreen, hardy perennial, one foot and a half high, from Persia in 1818: flowers, from June till August, yellow; propagated by division of the plant in sandy loam.—Venten. Cels. 54.

33. Long-leaved Milfoil (*A. macrophylla*, Linnæus). An ornamental, evergreen, hardy perennial, three feet high, from Italy in 1710: leaves winged, smooth; leafits lance-shaped, cut, saw-toothed, the outer ones confluent; flowers, in July and August, white; bundle compound; propagated by division in common soil.—Trin. Ob. 23.

34. Musk Milfoil (*A. moschata*, Jacquin). An ornamental, evergreen, hardy perennial, two feet high, from Italy in 1775: leaves comb-toothed, winged, smooth; leafits line-like, bluntish, entire, dotted; flowers, in June and July, white; propagated by division in common soil.—Jacq. Aus. I. 77.

35. Dwarf Milfoil (*A. nana*, Linnæus). An ornamental, evergreen, hardy perennial, six inches high, from Italy in 1759: leaves winged, velvety; leafits toothed, line-like; stem quite simple; flowers from June till August; propagated by division in common soil.—Allioni, Ped. I. 3.

36. Holy Flax Milfoil (*A. Santolina*, Linnæus). An ornamental, evergreen, hardy perennial, one foot high, from the Levant in 1759: leaves winged, somewhat downy; leafits three-parted, across, distant; segments three-toothed; stem branched; flowers, from June till August, pale yellow: propagated by division in peaty loam.

37. Santolinan Milfoil (*A. santolinoides*, Lagasca). An ornamental, deciduous, hardy perennial, one foot high, from Spain: flowers, from June till August, white; propagated by division in common soil.

38. Slender Milfoil (*A. tenuifolia*, Lamarck). An ornamental, evergreen, frame perennial, from the Levant in 1733: leaves wing-leaved, somewhat downy; leafits three-parted, blunt, entire, transversely tiled; ray rarely longer than the fence; flowers, from June till August, pale yellow; propagated by cuttings in common soil.

39. Valesian Milfoil (*A. Vallesiaca*, Suter). An ornamental, deciduous, hardy perennial, one foot high, from Switzerland in 1819: flowers, from June till August, white; propagated by division in common soil.

IV.

LEAVES DOUBLY-WINGED, AND DOUBLY WING-CUT.

40. Southernwood Milfoil (*A. abrotonifolia*, Linnæus). An ornamental, evergreen, hardy perennial, two feet high, from the Levant in 1739: leaves doubly-winged downy; leaflets very fine, line-like, entire, distant; flowers, from June till August, yellow; bundles compound and pyramidal; propagated by division in peaty loam.

41. Golden Milfoil (*A. aurea*, Lamarck). An ornamental, evergreen, hardy perennial, one foot high, from the Levant in 1739: leaves doubly winged, downy; leafits line-like, lance-shaped, toothed; flowers, from June till September, yellow; bundles simple; propagated by division in common soil.

42. Bannatic Milfoil (*A. Bannatica*, Waldstein). An evergreen, hardy perennial, one foot high, from Hungary in 1816: flowers, from June till August, white; propagated by division in common soil.

43. Flat Milfoil (*A. coarctata*, Poiret). An ornamental, evergreen, hardy perennial, four feet high, from the south of Europe in 1816: flowers, from July till September, yellow; bundle flattish; propagated by division in common soil.

44. Compact Milfoil (*A. compacta*, Willdenow). An ornamental, evergreen, hardy perennial, one foot high, introduced in 1803: leaves doubly wing-cleft, bristle-like, velvety; segments lance-shaped, entire; flowers, in July and August, pale yellow; bundle contracted and flattish; propagated by division of the plant in common soil.

45. Samphire Milfoil (*A. crithmifolia*, Kitaibel). An ornamental, evergreen, hardy perennial, six inches high, from Hungary in 1804: leaves downy; stem leaves doubly wing-cleft, with line-like, blunt segments; radical leaves winged; flowers, in July and August, white; bundles compound; propagated by division in peaty loam.—Wald., I., 66.

46. Toothed Milfoil (*A. dentifera*, De Candolle). An evergreen, hardy perennial, one foot and a half high, from the south of France in 1818: flowers, from June till August, white; propagated by division in common soil.

47. Distant Milfoil (*A. distans*, Kitaibel). An evergreen, hardy perennial, three feet high, from Italy in 1804: leaves doubly winged-cleft; segments lance-shaped, cut, saw-toothed; flowers, in July and August, white; bundles pyra-

midal, compound; propagated by division in common soil. *A. ambigua*, Palling; *A. Allioni*, Ped. 53, 1.

48. Doubtful Milfoil (*A. dubia*, Fischer). An evergreen, hardy perennial, one foot high, from Siberia in 1820: flowers, from June till August, white; propagated by division in common soil.

49. Eupatorian Milfoil (*A. Eupatorium*, Willdenow). An ornamental, evergreen, hardy perennial, four feet high, from the shores of the Caspian in 1833: leaves doubly wing-cleft, hoary; segments line-like, lance-shaped, saw-toothed; flowers, in July and August, yellow; bundle compound, globular; propagated by division in common soil.

50. Glomerated Milfoil (*A. glomerata*, Bieberstein). An ornamental, evergreen, hardy perennial, one foot high, from Caucasus in 1818: flowers, in July and August, yellow; propagated by division in common soil.

51. Various-leaved Milfoil (*A. heterophylla*, Sprengel). An evergreen, hardy perennial, one foot high, introduced in 1826: flowers, in June and August, white; propagated by division in common soil.

52. Intermediate Milfoil (*A. intermedia*, Schleicher). An evergreen, hardy perennial, one foot high, from Switzerland in 1819: flowers, in June and August, white; propagated by division of the plant in common soil.

53. Woolly Milfoil (*A. lanata*, Sprengel). An ornamental, evergreen, hardy perennial, one foot high: leaves doubly wing-cleft, velvety; segments lance-shaped, blunt; bundles pyramidal, compound; flowers, in July and August, white; propagated by division in common soil.

54. Slight-leaved Milfoil (*A. leptophylla*, Bieberstein). An ornamental, evergreen, hardy perennial, one foot high, from Tauria in 1816: flowers, in July and August, pale yellow; propagated by division in common soil.

55. Lovage Milfoil (*A. ligustica*, Allioni). An ornamental, evergreen, hardy perennial, four feet high, from Italy in 1791: leaves doubly wing-cleft; segments line-like, finely saw-toothed; flowers stem winged entire; flowers, in June and August, white; bundle compound, pyramidal; propagated by division in common soil.—Allioni, Ped. I., 83, 2.

56. Great Milfoil (*A. magna*, Linnæus). An evergreen, hardy perennial, three feet high, from the south of Europe in 1683: leaves thrice wing-cleft; segments lance-shaped, pointed; flowers, from June till November, white; propagated by division in common soil.

57. Small-flowered Milfoil (*A. micrantha*, Willdenow). An ornamental, hardy evergreen perennial, one foot high, from the Levant in 1805: leaves doubly wing-cleft, downy; segments lance-shaped, entire; flowers, from June till October, yellow; bundle compound; propagated by division in common soil.

58. Small-leaved Milfoil (*A. microphylla*, Willdenow). An ornamental, evergreen, hardy perennial, one foot high, from Spain in 1800: leaves doubly wing-cleft, shorter than the intervals between them; segments line-like, entire; flowers, from July till September, white; bundles compound, pyramidal; propagated by division in common soil.

59. Yarrow (*A. millefolium*, Linnæus). An ornamental, evergreen, British perennial, two feet high, common in fields: leaves doubly winged, slightly hairy, their segments line-like, toothed, pointed; stems furrowed; flowers, from June till October, white; propagated by division in common soil.—Eng. Bot. 758.

60. Mountain Milfoil (*A. montana*, Schleicher). An evergreen, hardy perennial, one foot high, from Switzerland in 1819: flowers, from June till August, white; propagated by division in common soil.

61. Thousand-leaved Milfoil (*A. myriophylla*, Willdenow). An ornamental, evergreen, hothouse perennial, one foot and a half high: leaves doubly winged, downy; leafits wing-cleft; segments line-like, awl-shaped; flowers, from July till September, white; bundles compound, pyramidal; propagated by division in common soil.

62. Noble Milfoil (*A. nobilis*, Linnæus). An ornamental, evergreen, hardy perennial, two feet high, from Germany in 1640: stem leaves doubly wing-cleft; segments line-like, somewhat toothed; flower-stem winged, toothed; radical leaves thrice wing-cleft; flowers, in June and August, white; propagated by division in common soil.—Sch. Han. III., 255.

63. Buff Milfoil (*A. ochroleuca*, Ehrhart, not Waldstein). An ornamental, evergreen, hardy perennial, two feet high: leaves somewhat doubly wing-cleft; leafits of the base undivided; segments line-like, lance-shaped; flowers, from July till September, pale yellow; bundle compound; fence cylindrical; propagated by division in common soil.

64. Odoriferous Milfoil (*A. odorata*, Linnæus). An ornamental, evergreen, hardy perennial, six inches high, from Spain in 1729: leaves doubly winged, hairy beneath; leafits line-like, entire; flowers, from June till August, white; bundles simple; propagated by division in common soil.—Jacq., c. I., 21.

65. Few-flowered Milfoil (*A. pauciflora*, Lamarck). An ornamental, evergreen, hardy perennial, one foot high, from Spain in 1820: flowers, in July and August, yellow; propagated by division in common soil.

66. Many-leaved Milfoil (*A. polyphylla*, Schleicher). An evergreen, hardy perennial, one foot high, from Switzerland in 1819: flowers, from June till August, white; propagated by division in common soil.

67. Downy Milfoil (*A. pubescens*, Linnæus). An ornamental, evergreen, hardy perennial, one foot high, from the Levant in 1739, leaves doubly wing-cleft, downy; segments line-like, lance-shaped, unequal, pointed; flowers, from June till September, light yellow; bundle compound; propagated by division in peaty loam.

68. Dotted Milfoil (*A. punctata*, Tenore). An ornamental, evergreen, hardy perennial, one foot high, from Naples in 1800: flowers, in July and August, straw yellow; propagated by division in common soil.

69. Rosy Milfoil (*A. rosea*, Waldstein). An evergreen, hardy perennial, one foot and a half high, from Hungary in 1816: flowers, from June till August, red; propagated by division of the plant in common soil.

70. Bristly Milfoil (*A. setacea*, Kitaibel). An ornamental, evergreen, hardy perennial, one foot high, from Hungary in 1805: leaves doubly winged; leafits line-like, bristle-like, sword-pointed, very compact, hairy; flowers, from June till August, white; bundle compound, pyramidal; propagated by division in peaty loam.

71. Bound Milfoil (*A. stricta*, Schleicher). An evergreen, hardy perennial, one foot and a half high, from Switzerland in 1820: flowers, in July and August, white; propagated by division in common soil.

72. Tansy Milfoil (*A. tanacetifolia*, Allioni). An ornamental, evergreen, hardy perennial, one foot high, from Switzerland in 1658: leaves doubly wing-cleft; segments lance-shaped, saw-toothed; flowers, in July and August, pink; bundle compound, spreading: propagated by division of the plant in common soil.—Magn. Hort. VI., 11, 14.

73. Taurian Milfoil (*A. Taurica*, Bieberstein). An ornamental, deciduous, hardy perennial, one foot high, from Tauria in 1818: flowers, in July and August, pale yellow; propagated by division in common soil.

74. Cottony Milfoil (*A. tomentosa*, Linnæus). A British, ornamental, evergreen, hardy perennial, two feet high: leaves doubly wing-cleft, cottony; the segments crowded, line-like, pointed; flowers, from May till October, yellow; bundles repeatedly compound; propagated by division in common soil.—Eng. Bot., 2532. [G. L.]

ACHIMENES COCCINEA, Persoon. The *Treverania coccinea*.

ACHLAMYDEÆ, Lindley. A cohort of the class *Exogeneæ Angiospermiæ*, and sub-class *Incompletæ*. It is

distinguished from the other allied cohorts by the total want of calyx and corolla: it contains five Nixus, namely, *Piperales*, *Salicinales*, *Monimiales*, *Podestimales*, and *Callitrales*. [A. C.]

ACHLYS, De Candolle (from the Greek, '*αχλυς*, the goddess of Obscurity). *Polyandria Monogynia*, Linnæus; *Berberideæ*, De Candolle.

1. Three-leaved Achlys (*A. triphylla*, De Candolle). A tuberous-rooted, hardy, ornamental perennial, from North America in 1827: flowers, from April till June, white; propagated by division in peaty soil.—Hook Fl. Bor. Amer., T. 12. [B. E.]

ACHNADONTON, Beauvois (from the Greek, '*αχνη*, "chaff," and '*οδους*, "a tooth"). A genus of grasses arranged by Kunth under *Phleum*. [B. E.]

ACHNANTHES, Bory (from the Greek, '*αχνη*, "froth of the ocean," and '*ανθος*, "a flower"). Froth Bloom. *Cryptogamia Algæ*, Linnæus; *Algæ Diatomaceæ*, Greville. Leaves on foot-stalks, standard-formed, composed of few joints, which after a time separate, without cohering at their angles.

1. Short-stalked Froth Bloom (*A. brevipes*, Agardh). A very minute down-like, greenish plant, parasitic on the smaller British sea-weeds in July: joints with two orange-coloured spots, line-like across, slightly curved; foot-stalk very short. *Echinella stipitata*, Lingbye.—Grev. Cr. Fl., T. 295.

2. Carmichael's Froth Bloom (*A. Carmichaelii*, Greville). A small greenish plant, parasitic on the smaller British sea-weeds: joints without spots, at least in the dry state, and without streaks, or a white cross band; foot-stalks long.

3. Long-stalked Froth Bloom (*A. longipes*, Agardh). A fine down-like, golden-green plant, parasitic on the small British sea-weeds: joints with one globular red spot, streaked, and having a white cross band; foot-stalks long. *Conferva stipitata*, Eng. Bot., T. 2488.

4. One-dotted Froth Bloom (*A. unipunctata*, Carmichael). A minute down-like, greenish plant, parasitic on the smaller British sea-weeds: joints with a single dot—Grev. Cr. Fl., 287. [B. E.]

ACHNATHERUM, Beauvois. A genus of grasses, arranged by Kunth under *Agrostis*, *Cinna*, and *Muhlenbergia*. [B. E.]

ACHRAS, Willdenow (from the Greek, '*αχρας*, "wild pear"). Pear-berry Tree. *Pentandria Monogynia*, Linnæus; *Sapoteæ*, R. Brown. Calyx five or six-parted; corolla egg-oblong, five or six-cleft, with many scales; fruit one-celled; seeds solitary, with a claw at the end, and a marginal seed-scar (*pilum*).

1. New Holland Pear-berry Tree (*A. australis*, R. Brown). An ornamental, greenhouse, evergreen tree, twenty feet high, from New Holland in 1827: flowers white; propagated by cuttings in peaty loam.

2. Common Pear-berry Tree (*A. Sapota*, Willdenow). An ornamental, stove evergreen, thirty feet high, from South America in 1731: leaves egg-oblong, spear-shaped; flowers, from April to June, white, solitary; fruit large, yellow; propagated by cuttings in rich mould.—Jacq. Amer., 57, T. 41.

3. Naseberry Tree (*A. Zapotilla*, Jacquin). An ornamental, evergreen, stove-tree, ten feet high, from South America in 1731: branched and diffuse; flowers, from April till June, white; fruit rounded, with the point of the seed-scar short; propagated by cuttings in rich mould.—Jacq. Amer., 57, T. 41, b. [B. E.]

ACHYRANTHES, Linnæus (from the Greek, '*αχυρον*, "chaff," and '*ανθος*, "a flower"). Chaff-flower. *Pentandria Monogynia*, Linnæus; *Amaranthaceæ*, Jussieu. Calyx with five leaves; scales five, united at the base into a tube, at the end fringed and alternate with the stamens; summit of the pistil two-parted; seed solitary, crowned by the conjoined leaves of the calyx.

1. Silver Chaff-flower (*A. argentea*, Lamarck). An evergreen, bark-stove, under-shrub, one foot high, from Sicily in 1713: leaves roundish, egg-oblong, tapering to a point; leaves of the calyx bent back, pressed close to the spike; flowers, from May till October, white; propagated by cuttings in sandy loam.—Flor. Græc., T. 244.

2. Rough Chaff-flower (*A. aspera*, Linnæus). An evergreen, bark-stove, under-shrub, three feet high, from India in 1751: leaves inversely egg-oblong, pointed, narrowed at the base; leaves of the calyx bent back, pressed close to the spikes; propagated by cuttings in sandy loam.—Miller, Icon. I., 11, 12.

3. New Holland Chaff-flower (*A. australis*, R. Brown). An evergreen, greenhouse, under-shrub, two feet high, from New Holland in 1823: flowers, in June and July, white; propagated by seeds in common soil.

4. Branched Chaff-flower (*A. brachiata*, Linnæus). A greenhouse annual, one foot high, from the East Indies in 1824: flowers, from July to September, white; propagated by seeds in common soil.—Pluk. Al., II., 334, 5.

5. Curled Chaff-flower (*A. crispa*, Desfontaines). An evergreen, greenhouse, under-shrub, two feet high, from South America in 1810: flowers, from May till October, whitish green; propagated by seeds in common soil.

6. Forked Chaff-flower (*A. dichotoma*, Linnæus). A hardy annual, one foot high, from North America: flowers, in June and July, green; propagated by seeds in common soil.

7. Shrubby Chaff-flower (*A. fruticosa*, Lamarck). An evergreen, greenhouse, under-shrub, six feet high, from the East Indies in 1820: stem erect; leaves egg-oblong; leaves of the calyx smooth; flowers from May till July, purple; propagated by cuttings in rich mould.

8. Globe-headed Chaff-flower (*A. globulifera*, Fischer). A stove annual, introduced in 1828: flowers, in July and August, white.

9. Snow-white Chaff-flower (*A. nivea*, Willdenow). An evergreen, greenhouse, under-shrub, two feet high, from the Canaries in 1780: leaves in whirls, egg-oblong, downy; flowers, from May till July, white; bundles, compact, forked; flowers with corollas; propagated by cuttings in rich mould.

10. Blunt-leaved Chaff-flower (*A. obtusifolia*, Lamarck). An evergreen, bark-stove, under-shrub, two feet high: flowers, from May till November, pink; propagated by cuttings in sandy peat.

11. Projecting Chaff-flower (*A. porrigens*, Jacquin). An evergreen, bark-stove, under-shrub, six feet high: leaves egg-oblong, lance-shaped, opposite; stem shrubby; flowers, from April till August, bundled on long stalks, spikes elliptical; propagated by cuttings in rich mould.—Bot. Mag., 830.

12. Downy Chaff-flower (*A. pubescens*, Roth). An evergreen, greenhouse, under-shrub, one foot and a half high; stem erect, rounded, and elliptical; leaves oblong, downy; flowers, from April to July, pink; spikes axillary and terminal, stalked; propagated by seeds in rich mould.

13. Whirled Chaff-flower (*A. verticillata*, Thunberg). An evergreen, greenhouse, under-shrub, one foot high, from the Cape of Good Hope in 1820: flowers, in July and August, white; propagated by seeds in common soil.

14. Twigged Chaff-flower (*A. virgata*, Desfontaines). An evergreen, greenhouse, under-shrub, two feet high, from the West Indies in 1817: flowers, from May till October, whitish-green; propagated by seeds in common soil. [G. L.]

ACHYRONIA, Willdenow (from the Greek, '*αχυρον*, "chaff"). Chaff-leaf. *Diadelphia Decandria*, Linnæus; *Leguminosæ Papilionaceæ*, Jussieu. Calyx five-toothed, lower tooth longish, two-cleft; stamens diadelphous; pod flattish, many-seeded; fruit with the same appearance as *Borbonia*. Or, ought we rather to say, Calyx five-toothed, the two lower teeth concreted, or four-toothed, with the lower-tooth twice divided?

1. Velvet Chaff-leaf (*A. villosa*, Wendland). An ornamental, evergreen, greenhouse shrub, three feet high, from New Holland in 1819: erect, branches sparsely silky and hairy; leaves lance-shaped, pointed, smooth on the margin, silky and velvety; flowers, in July and August, yellow, axillary, and with foot-stalks; propagated by cuttings in peaty loam.—Herrenh., I., Tab. 12. [G. L.]

ACHYROPHORUS, D. Don (from the Greek, '*αχυρον*, "chaff," and *φορεω*, "I bear"). Cat's Ear. *Syngenesia Æqualis*, Linnæus; *Compositæ Chicoraceæ*, Jussieu.

1. Spotted Cat's Ear (*A. maculatus*, D. Don). A deciduous perennial, found in chalky and dry places in Britain: stem solitary, almost leafless; leaves inversely egg-oblong, undivided, toothed, rough, spotted above; flowers, in July, deep yellow; the fence and two to three flower-scales slightly hairy. *Hypochæris maculata*, Linn.—Eng. Bot., T. 225.

ACIANTHUS, R. Brown (from the Greek '*ακις*, "a point," and '*ανθος*, "a flower"). Point Flower. *Gynandria Monandria*, Linnæus; *Orchideæ*, Jussieu. The tips of the flowers bristly.

1. Tailed Point-flower (*A. caudatus*, R. Brown). An ornamental, tuberous-rooted, greenhouse perennial, one foot high, from New Holland in 1826: flowers, in May and June, brown; propagated by the root-tubers in peaty loam.

2. Exserted Point-flower (*A. exsertus*, R. Brown). An ornamental, tuberous-rooted, greenhouse perennial, one foot high, from New Holland in 1822: flowers, in May and June, brown; propagated by the root-tubers in rich mould.

3. Arched Point-flower (*A. fornicatus*, R. Brown). An ornamental, tuberous-rooted, greenhouse perennial, one foot high, from New Holland in 1822: flowers, in May and June, brown; propagated by the root-tubers in peaty loam. [B. E.]

ACICARPHA, Jussieu (from the Greek '*ακις*, "a point," and *καρφος*, "chaff"). Point-chaff. *Syngenesia Necessaria*, Linnæus; *Calycereæ*, Jussieu. Calyx fence five-parted; corollas all tubular; receptacle all chaffy; down wanting; stamens separate.

1. Spatulate Point-chaff (*A. spatulata*, Jacquin). An evergreen, stove perennial, six inches high, from Brazil in 1824: flowers, from July till October, yellow; propagated by division in peaty loam. [G. L.]

ACICULA, Dumortier. The flower-stalk when as small as a bristle. It is an unnecessary term.

ACICULAR, ACICULATED. Needle-shaped, applied to leaves and other members of plants.

ACIDOTON, Brown (from the Greek '*ακιδοτος* "pointed"). Pointwort. *Monœcia Polyandria*, Linnæus; *Euphorbiaceæ*, Jussieu. Male flowers with the calyx five-leaved and no corolla; stamens thirty-five to forty; female flowers with the calyx six-leaved, no corolla; pistil three-cleft; capsule with three dry elastic seeds.

1. Stinging Point-wort (*A. urens*, Willdenow). An evergreen, greenhouse shrub, eight feet high, from Jamaica in 1793: leaves alternate, egg-oblong, spear-shaped; flowers, from April till June, green, in clusters; propagated by cuttings in peaty loam.—Sloane, Jam., I., T. 83, f. 1. [G. L.]

ACIDS. In vegetable physiology, an important class of chemical substances. Chemists have generally been in the practice of giving the name of vegetable acids to such substances as have oxygen united to a double base of carbon and hydrogen: but they know very well that at present this method of expression is far from being correct. Indeed, on the one hand, they are obliged to class under this denomination a great number of acids which are not vegetable productions, although by their ternary composition they resemble vegetables; such as the oleic, margaric, stearic, laccic, and butiric acids, which are of animal production, and the mellitic acid, which is mineral. They are also very rigorous in excluding from the list of vegetable acids those which contain azote, such as the aspartic, the hydrocyanic, and the like.

Among vegetable acids, so called by chemists, we ought to exclude as foreign to our purpose those which do not make a part of the living vegetable; such as the succinic acid, which is probably vegetable, but which we cannot find in living plants: such are also the camphoric, mucic, amylic, pyrotartaric, suberic, nauceic, violacic, indigotic, carbazotic, ricinic, eloiodic, pyromatic, and the like, which are produced from vegetables, but obtained by artificial means, and which cannot be found free in living plants.

The fundamental property of these acids, as every one knows, is to redden vegetable blue colours, and also to form salts when they combine with alkalis. Besides these general properties, vegetable acids are in general susceptible of crystallisation, are more or less deliquescent, more or less soluble in water, and still more so in alcohol, and all of them are capable of being decomposed by the nitric acid. It was long supposed that these fundamental properties of acids must be owing to combination with a large proportion of oxygen; but examples prove that acidity can be produced by very different causes; and, although oxygenation may be the most frequent, it is not the only one. We may therefore arrange vegetable acids in the following manner:—

I.

HYDROCARBONATED ACIDS, CONTAINING OXYGEN AND HYDROGEN IN NO GREATER PROPORTION THAN THEY ARE IN WATER.

1. Gallic Acid. | 2. Humic Acid.

II.

SUPEROXYGENATED ACIDS.

3. Acetic Acid.	9. Kinic Acid.	15. Oxalic Acid.
4. Citric Acid.	10. Krameric Acid.	16. Pectic Acid.
5. Equisetic Acid.	11. Lichenic Acid.	17. Rheic Acid.
6. Ginckoic Acid.	12. Malic Acid.	18. Selenic Acid.
7. Glaucic Acid.	13. Meconic Acid.	19. Tartaric Acid.
8. Igasuric Acid.	14. Moric Acid.	

III.

SUPERHYDROGENATED ACIDS.

20. Abietic Acid.	22. Kahincic Acid.	24. Pinic Acid.
21. Benzoic Acid.	23. Phocenic Acid.	25. Stearic Acid.
	26. Sylvic Acid.	

IV.

NITROGENATED ACIDS.

27. Aspartic Acid.	28. Fungic Acid.	29. Hydrocyanic Acid.

[P. D.]

ACINACIFORM (in Latin, *Acinaciformis*). Scymitar-shaped; applied to the leaves and other members of plants.

ACINI. The hard pips in grapes and strawberries. [B. E.]

ACINODENDRON. The *Melastoma Acinodendron*, Linnæus; *Miconia Acinodendron*, Ruiz and Pavon.

ACINUS. Among old botanical writings, a bunch or cluster of fruit, such as grapes.

ACIOTIS, D. Don (from the Greek, '*ακις*, "a point," and '*ους*, "an ear"). Point-ear. *Decandria Monogynia*, Linnæus; *Melastomaceæ*, Jussieu. The petals like pointed ears.

1. Water Point-ear (*A. aquatica*, D. Don). An evergreen, stove under-shrub, nine inches high, from South America in 1793: leaves opposite, heart-shaped, nicked, hairy; branches much spreading; flowers, in June and July, whitish-red, in terminal panicles of threes; propagated by cuttings in peaty loam. *Rhexia aquatica*, Linnæus.—Anb. Gui., I., T. 169.

2. Various-coloured Point-ear (*A. discolor*, D. Don). An ornamental, evergreen, stove shrub, one foot high, from Trinidad in 1816: leaves five-ribbed, oblong, smooth, yellowish beneath; flowers, from July to September, whitish-red, clusters bouquet-formed; propagated by cuttings in sandy peat. *Melastoma discolor*, Willdenow.—Plu., Icon., T. 42, f. 1. [G. L.]

ACIS, Salisbury (from Acis, the son of Faunus). Shepherd's Lily. *Hexandria Monogynia*, Linnæus; *Amaryllideæ*, Jussieu. A genus separated from *Leucojum*.

1. Autumnal Shepherd's Lily (*A. autumnalis*, Sweet). An ornamental, hardy, bulbous plant, six inches high, from Portugal in 1629: flowers, in September, pink; propagated by offsets in sandy loam. *Leucojum autumnale*, Lin. Bot. Mag. 960.

2. Large-flowered Shepherd's Lily (*A. grandiflorus*, Redoute). A hardy, bulbous plant, six inches high, from Numidia in 1820: flowers, in August and September, white; propagated by offsets in sandy loam.—Bot. Reg. 544.

3. Rose Shepherd's Lily (*A. roseus*, Sweet). A hardy, bulbous plant, three inches high, from Corsica in 1820: flowers, in August and September, red; propagated by offsets in sandy loam. *Leucojum roseum*, Mart. Sweet, Fl. G. 301.

4. Hair-leaved Shepherd's Lily (*A. trichophyllus*, Sweet). A hardy, bulbous plant, six inches high, from Spain in 1820: flowers, in January and February, white; propagated by offsets in sandy loam. *Leucojum trichophyllum*, Brot. [G. L.]

ACISANTHERA, Jussieu (from the Greek, '*ακις*, "a point," and '*ανθηρα*, "anther"). Point-anther. *Decandria Monogynia*, Linnæus; *Melastomaceæ*, Jussieu. Calyx bellying; petals five; stamens arrow-shaped and vacillating; capsule crowned by the calyx; cells two, many-seeded.

1. Square Point-anther (*A. quadrata*, Persoon). An evergreen stove shrub, three feet high, from Jamaica in 1804: propagated by cuttings in peaty soil. *Rhexia Acisanthera*, Linnæus.—Brown, Jam. 22, 1.

ACLADIUM, Link. A genus of fungi, arranged by Fries under *Sporotrichum*, &c.

ACMADENIA, Bartling (from the Greek, '*ακμη*, "a point," and '*αδην*, "a gland"). Gland-point. *Pentandria Monogynia*, Linnæus; *Rutaceæ*, Jussieu.

1. Angled Gland-point (*A. tetragona*, A. St. Hilaire). An ornamental frame shrub, two feet high, from the Cape of Good Hope in 1798: flowers, from April till June, white; propagated by cuttings in peaty loam. *Adenandria tetragona*, Sweet.—Thunb. V., 4, 5.

ACMELLA, Richard (from the Greek, '*ακμη*, "a point"). Point Wort. *Syngenesia Superflua*, Linnæus; *Compositæ Helianthea*, Jussieu. Fence simple, with a few somewhat leafy divisions; receptacle oblong, chaffy; heads rayed; seed-vessels four-cornered, abrupt at the end, naked.

1. Mauritian Point Wort (*A. Mauritiana*, Persoon). A bark-stove annual, one foot and a half high, from Mauritius in 1768: stem procumbent, downy; leaves egg-oblong, entire; flower-stalks at the side; ray shorter than the disk; flowers, in July and August, yellow; propagated by seeds in sandy loam. *Spilanthes acmella*, Linn. Rum. Am. VI. 65.

2. Occidental Point Wort (*A. occidentalis*, Persoon). An ornamental, trailing annual, six inches high, from South America in 1825: flowers, in July and August, yellow; propagated by seed in common soil.

3. Creeping Point Wort (*A. repens*, Walter). An ornamental, creeping annual, six inches high, from Carolina in 1818: flowers, in July and August, yellow; propagated by seeds in common soil. *Spilanthes repens*, Michaux. [G. L.]

ACMENA, De Candolle (from Acmena, one of the nymphs of Venus). Nymph-flower. *Icosandria Monogynia*, Linnæus. *Myrtaceæ*, Jussieu. A genus separated from *Metrosyderos*.

1. Floribund Nymph Flower (*A. floribunda*, De Candolle). An ornamental, evergreen, greenhouse shrub, six feet high, from New Holland in 1788: flowers, in June and July, white; propagated by cuttings in sandy loam. *Metrosideras floribundus*, Smith.—Vent. Mal. 75. [B. E.]

ACNIDA, Linnæus (from the Greek ἀ, privative, and κνίδη, "a nettle"). Stingless Nettle. *Diœcia Pentandria*, Linnæus; *Chenopodeæ*, Jussieu. Male-flowers with the calyx 5-parted and no corolla; female flowers with the calyx 3-parted, and three pistils without styles; capsule 1-seeded.

1. Hemp Stingless Nettle (*A. cannabina*, Linnæus). A hardy annual, two feet high, from North America in 1640: leaves spear-shaped; flowers, in June and July, greenish-yellow; capsules rather smooth, with sharp angles; propagated by seeds in common soil. [B. E.]

ACONITUM, Pliny. Wolf's-bane, Monk's-hood, or Aconite; a large genus of plants, which having been arranged in four divisions, it will be more convenient to make each of these a separate genus. The four genera, then, will be *Anthora*, *Cammarum*, *Lycoctonum*, and *Napellus*. [B. E.]

ACORN. The fruit of the oak. In the vale of Berkeley, in Gloucestershire, according to Mr. Marshall, acorns are in high esteem among the farmers, who seem to be as anxious about them as their apples. They consider them as the best means of fattening hogs, and think they make the bacon firm, and weigh better than bean-fed bacon. The price of acorns there is from 1*s*. 6*d*. to 2*s*. per bushel, according to the season and price of beans. Few are sold, however; every farmer collecting his own, or tending his pigs upon them.

Some care is necessary to be taken when hogs are fed upon acorns, for otherwise they will be subject to constipation, and the disease called the Garget. These may, however, be avoided by mixing laxative substances with them, and not allowing them to have too many given at a time: at first a few, twice a day, is often enough; afterwards three times a day. The hogs, while they eat this food, should not be confined to the stye, but be suffered to run at large; for if their liberty be too much abridged, they never thrive well or grow fat on this sort of food.

In Hertfordshire, it is no uncommon thing, with the management above directed, and the assistance of a little wash, and a few grains now and then, for a farmer to kill several hogs in a season which weigh from eight to ten score, and sometimes even more. Hogs fed in this way make very good meat; but it is not here thought by some so fine as when they are taken up, and four or five bushels of barley-meal given to each to complete their fattening. [F. F.]

ACOROIDEÆ, Link (*Acorus* Tribe). An order rejected by most botanists, but adopted by Lindley in his *Nixus Plantarum*: it is distinguished from *Aroideæ* by having bisexual flowers and a syncarpous (one with several cells) ovary; while *Aroideæ* have unisexual flowers with a simple 1-celled ovary, the ovules and seeds being attached to its one side. Dr. Lindley states that the *Aroideæ* are syncarpous, and the *Acoroideæ* apocarpous, while we find the reverse to be the case.—See AROIDEÆ. [K. A.]

ACORUS, Linnæus (from the Greek ἀ, privative, and κόρη, "the pupil of the eye"). Sweet Flag. *Hexandria Monogynia*, Linnæus. *Aroides Orontiaceæ*, B. Brown. Flower-sheath cylindrical, covered with florets; calyx with six persistent leaves, naked; capsule 3-celled, and many seeded.

1. Common Sweet Flag (*A. calamus*, Linnæus). A British water perennial, two feet high, found in pools: point of flower-stalk very long, leafy; flowers, in June and July, green, without petals; propagated by division in marshy soil.—Eng. Bot. 356.

2. Grassy Sweet Flag (*A. gramineus*, Hort. Kew.). An ornamental, evergreen, perennial, four inches high, from China in 1796: point of the flower-stalk scarcely longer than the sheath; flowers, in February, green, without petals; propagated by division of the plant in sandy peat.—Sm. Spec. 15.

3. Chinese Sweet Flag (*A. terrestris*, Sprengel). An ornamental, evergreen perennial, one foot high, from China in 1822: flowers, in June and July, green, without petals propagated by division of the plant in common soil.—Sm. Spec. 15, T. 17. [G. L.]

ACOTYLEDONES, Jussieu (from the Greek ἀ, "without," and κοτυλήδων, "a seed lobe"). One of the great classes of the Jussieuan system. It has also been called *Agamæ* by Humboldt, and it corresponds with the *Cryptogamia* of Linnæus; is the *Exsexuales* of Lindley; the *Exembryonatæ* or *Arhizæ* of Richard; and the *Cellulares* of De Candolle. It comprehends, likewise, part of the *Endogenæ* of De Candolle. There are no flowers; no known sexual organs; and no seeds, reproduction having taken place by means of spores or sporules, which appear to yield new plants by dilatation and having no embryo, they have therefore no radicle or cotyledons. The substance of the plant is principally composed of cellular tissue; the stems do not present spiral vessels: in some orders, as in the Ferns (*Filices*), there are annular ducts; in others, as in the Mosses (*Musci*), and the Mushrooms (*Fungi*), these ducts are wholly wanting. [K. A.]

It will be seen from the preceding details that Acotyledonous plants embrace merely the lower grades of the vegetable creation, being placed, as it were, at the bottom of the scale, and exhibiting in their outward aspect, as well as in their internal structure, nothing of that attractiveness of form, and but rarely that brilliancy of colouring; nothing of that complicated workmanship by which the higher grades of vegetables are distinguished. They are the first and simplest forms of vegetable life—many of them consisting merely of a cluster of minute cells, or of minute threads, as in the case of *Proto-coccus* and *Byssus*; and many of them being, in fact, nothing more than a mere slime or *mucor*, as in the moulds and nostocs. Yet these minute, neglected, and apparently insignificant vegetables are by no means useless or superfluous in the scale of nature. They serve to complete and keep up the integrity of the vegetable creation, whether it be by decomposing putrid and fecal matters preparing a sort fit for vegetables of a higher order. They are scattered over all climates and all quarters of the world, replenishing both

earth and sea with vegetable life, and ascending even into the regions of the air by the very levity of their seeds, spores, or *bulbules*, as M. Richard terms them, to be wafted on the winds, till drenched with moisture they descend again ready to cling to the soil that suits them, if it should be even the surface of the flinty rock, or to spread themselves over mountains of eternal snow, or to immerse themselves in the waters of the ocean. Thus many of the *Algæ* at least sow their seeds, and thrive where no other plant would live. They grow up, come to maturity, and perish where they grow, forming, in the process of years, a soil of some depth. First mosses, and then ferns are found to follow in their path, leaving a soil deeper and richer still, till at last in the revolution of ages the very surface of the barren rock is covered with a soil capable of supporting the loftiest trees. [I. K.]

ACRATHEREUM, Link. Slim grass. *Polygamia Monœcia*, Linnæus; *Gramineæ*, Jussieu. Spike 2-flowered; husks two, keeled; chaff two, beset with very minute hairs; chaff-scales two, abrupt, and somewhat toothed; anthers long and dark purple; seed unknown.

1. Millet Slim Grass (*A. miliaceum*, Link). A perennial hardy grass, two to three feet high, from Nepaul; joints hairy; leaves rough; leaf-sheath streaked; sheath-scale short; flowers in clustered branchy panicles. [M. K.]

ACRE. The prevailing and standard measure of land in Britain. An acre in England contains 4 square roods; a rood 40 perches, rods, or poles, 5½ yards or 16½ feet each, according to the statute in the act passed in 1824, for the equalization of weights and measures throughout the United Kingdom, which is in this instance confirmatory of the old law of England. But in some parts of England there are other measures under the same designation of *acre*. For example, in Devonshire and part of Somerset, 5 yards (instead of 5½) have been reckoned to a perch; in Cornwall, six yards (anciently called the woodland perch); in Lancashire, 7 yards; in Cheshire and Staffordshire, 8 yards; in the Isle of Purbeck, and some parts of Devonshire, 15 feet and 1 inch. In the common fields of Wiltshire and the neighbouring counties, 120 poles, or three roods, were reckoned to an acre.

The Irish acre is 7840 square yards, and is equal to 1 acre, 2 roods, and 19 poles nearly of English measure.

The Scotch acre contains 5760 square Scotch ells, and is equal to 1 acre, 1 rood, 2 poles, nearly of English measure.

The following Table shows the comparative quantity of each of the above measures:

A.	R.	P.		
120	3	20	Devonshire Customary measure,	Equal to one hundred statute acres.
119	2	26	Isle of Purbeck ditto,	
84	0	4	Cornish or Woodland ditto,	
61	2	37½	Lancashire or Irish ditto,	
47	1	2½	Cheshire and Staffordshire ditto,	
133	2	0	Wiltshire tenantry ditto,	
79	1	6½	Scotch measure,	

The French acre, or *arpent*, according to Mr. Greave's calculation, consists of 100 perches, of twenty-two feet each, amounting to 48,400 square French feet, which are equal to 51,691 square English feet, or very near one acre, and three quarters of a rood, English measure. The Strasburg acre is about half an English acre.

An Account of the Number of Plants, or Trees, which may be planted on a Rood, Perch, or an Acre of Land, at different distances.

In an acre are

4 roods, each rood forty perches.
160 perches, sixteen feet and a half each.
4,840 square yards, nine feet each.
43,560 square feet, 144 inches each.
174,240 squares of six inches each, thirty-six inches each.
6,272,640 inches, or squares, of one inch each.

Table exhibiting the Number of Plants which may be raised on a Perch of Land, at different distances.

In a perch are 272¼ square feet, or 39,204 square inches. A perch will contain

Trees or Plants.	Inches over.	Number of Inches asunder.	Square Inches to each.	Trees or Plants.	Inches over.	Number of Inches asunder.	Square Inches to each.
2450	4	4 by 4	16	612	36	8 by 8	64
1960	. .	5 — 4	20	490	4	10 — 8	80
1633	12	6 — 4	24	392	4	10 — 10	100
1069	. .	6 — 6	36	272	36	12 — 12	144
816	36	8 — 6	48	261	54	15 — 10	150

An acre will contain

Trees or Plants.	Inches over.	Number of feet asunder.	Square feet to each.	Trees or Plants.	Inches over.	Number of feet asunder.	Square feet to each.
108	360	20	400	2178	. .	5 by 4	20
160	. .	16½	272¼	2722	8	4 — 4	16½
134	144	18	324	2904	. .	5 — 3	15
302	72	12	144	3630	. .	4 — 3	12
435	60	10	100	4840	. .	3 — 3	9
680	40	8	64	5445	. .	4 — 2	8
888	48	7	49	7260	. .	3 — 2	6
1089	. .	8 by 5	40	8712	. .	2½ — 2	5
1210	. .	6	36	10,890	. .	2 — 2	4
1361	8	8 — 4	32	19,305	. .	1½ — 1½	2½
1452	. .	6 — 5	30	21,780	. .	2 — 1	2
1555	20	7 — 4	28	43,560	. .	1	1
1815	. .	6 — 4	24				

A Table for the more readily calculating the value of several Crops on an Acre of Land.

		£.	s.	d.
43,560 plants (a plant to each foot), at	1d.	181	10	0
	½	90	15	0
	¼	45	7	0
19,360 plants, at	¼ each			
9680	¼ „			
4840 (a plant to each yard) at	1d. „			
2420	2d. „	20	3	4
1210	4d. „			
605	8d. „			
7000 plants, at . . .	2d. „ . .	62	6	8
5200	2d. „ . .	43	6	8
2200	2d. „ . .	18	6	8

		£.	s.	d.
9980 plants,		40	6	8
6970 „		31	0	10
6533 „		27	4	6
5460 „		22	15	0
5445 „	at 1d. each	22	13	9
4356 „		18	3	0
3630 „		15	2	6
1000 „		4	3	4
160 „		0	13	4
15,000 plants,		31	5	0
7000 „		15	11	8
6534 „	at 1½d. each	13	12	3
6660 „		13	17	8
5000 „		10	8	4

[G. L.]

ACREMONIUM, Link (from the Greek '*ακρεμων*, "a branch"). Clung-mould. *Cryptogamia Fungi*, Linnæus; *Hyphomycetes mucedines*, Fries. The sprout-bed (*thallus*) slightly branched; flocks partitioned, with very slender branchlets terminating in a spore-case (?) vesicular, adherent, rampant, entangled, and decumbent.

1. Alternate Clung Mould (*A. alternatum*, Link). The sprout-bed spreading, white, with fertile alternating branchlets; spore cases (?) globular and alternate; grows on fir trees.—Sturm, Deutsch., Fl. III., Tab. 2.

2. Dusky Clung Mould (*A. fuscum*, Kunze). The sprout-bed olive brown, with fertile, opposite, or alternate branchlets; spore cases (?) globular; on old wood, and the stems of herbs in spring and autumn.

3. Shining Clung Mould (*A. nitidum*, Martius). Not much known.

4. Whirled Clung Mould (*A. verticillatum*, Link). The sprout-bed white, spreadiug, with fertile whirled branchlets the spore cases (?) egg-oblong; grows on the bark of fir trees.—Grev. Crypt. Scot., T. 124, fig. 2.

[N. F.]

ACRE TAX. A tax laid on land by the acre. In some places this was called acre-shot. [F. F.]

ACROCEPHALUS, Bentham (from the Greek, '*ακρος*, "summit," and *κεφαλη*, "head"). Branch-top. *Didynamia Gymnospermia*, Linnæus; *Labiatæ*, Jussieu. A genus separated from *Sumnitzera*.

1. Headed Branch-top (*A. capitatus*, Bentham). A hardy annual, a foot and a half high, from China in 1806: flowers, in July and August, white; propagated by seeds in sandy loam. *Sumnitzera capitata*, Willd.

ACROCOMIA, Von Martius (from the Greek, '*ακρος*, "top," and *κομη*, "tuft"). Tuft Palm. *Monœcia Hexandria*, Linnæus; *Palmæ*, Jussieu. A genus separated from *Cocos* and *Bactrius*.

1. Prickly Tuft Palm (*A. aculeata*, Loddige). An ornamental, stove palm, forty feet high, from the West Indies in 1796: stem cylindrical, prickly upwards; leaves winged and prickly; flowers pale green; propagated by seeds in rich loam. *Cocos aculeata*, Linn.—Jacq. Amer., 169.

2. Spindle Tuft Palm, or Great Macaw Tree (*A. fusiformis*, Sweet). An ornamental stove palm, from Trinidad in 1731: flowers scarlet; propagated by seeds in rich soil.—*Cocos fusiformis*, Swartz.

3. Globose Tuft Palm (*A. globosa*, Loddige). An ornamental stove palm tree, twenty feet high, from St. Vincent's in 1824: propagated by seeds in rich soil.

4. Guiana Tuft Palm (*A. Guianensis*, Loddige). An ornamental stove palm, thirty feet high, from Demerara in 1824: propagated by seeds in rich soil.

5. Frightful Tuft Palm (*A. horrida*, Loddige). A stove palm, thirty feet high, from Trinidad in 1825: propagated by seed in rich soil.

6. Minor Tuft Palm (*A. minor*, Loddige). An ornamental stove palm, twenty feet high, from South America in 1823: flowers scarlet; propagated by seed in rich soil.

7. Hard Fruited Tuft Palm (*A. sclerocarpa*, Von Martius). An ornamental stove tree, forty feet high, from Brazil in 1822: flowers scarlet; propagated by seed in rich soil.—Mart. Palm. Icon.

8. Slender-leaved Tuft Palm (*A. tenuifolia*, Loddige). An ornamental stove palm, thirty feet high, from Brazil in 1824: propagated by seed in rich soil.

[B. E.]

ACROGLOCHIN, Schrader (from the Greek, '*ακρος*, "top," and *γλωχις*, "an awn"). Awn-top. *Monœcia Pentandria*, Linnæus; *Amaranthaceæ*, Jussieu. A genus separated from *Amaranthus*.

1. Goose-footed Awn-top (*A. chenopodioides*, Schrader). A hardy annual, a foot and a half high, from Nepaul in 1824: flowers, in June and July, green; propagated by seeds in common soil. *Amaranthus Acroglochin*, Sprengel. [G. L.]

ACROSARCUM, Desvaux. A berry (*Bacca*, Linnæus).

ACROSPERMUM, Tode, not Nees (from the Greek, '*ακρος*, "top," and *σπερμα*, "seed"). Top Seed. *Cryptogamia Fungi*, Linnæus; *Trichodermacei Solerotii*, Fries. Longish, somewhat clavate, bearing spores distinctly at the top.

1. Flattish Top Seed (*A. compressum*, Tode). Scattered on fungi in autumn: colour dark olive, flattish, rather blunt, mostly spear-shaped, on foot-stalks.—Bullard, T. 256.
2. Conical Top Seed (*A. conicum*, Fries).
3. Horned Top Seed (*A. cornutum*, Fries). Gregarious on dead plants in autumn: colour rufous, becoming paler; horn-like, smooth, furrowed when dry.
4. Pyramidal Top Seed (*A. pyramidale*, Fries).
5. Sclerotian Top Seed (*A. sclerotioides*, Fries).

ACROSPIRE. A point of the gemlet which bursts through the grain in the process of malting. [B. E.]

ACROSPORIUM, Nees (from the Greek, '*ακρος*, "top," and *σπορα*, "spore"). Top Spore. *Cryptogamia Fungi*, Linnæus; *Mucorini Botryoidei*, Fries.

1. Parcelled Top Spore (*A. fasciculatum*, Greville). In sea-green patches, on rotten oranges; filaments branched, erect, rather parcelled, in spreading tufts.
2. Necklace Top Spore (*A. monilioides*, Nees). In white spots on the leaves of living grasses; filaments simple. [B. E.]

ACROSTIC FERN (*Acrostichum*, Linnæus). The greater number of the species have not been cultivated. Being nearly all plants of tropical climates they require to be planted in pots and plunged in the bark-pits of a stove. The elk's horn will stand the green-house. They are all propagated by division, or by sowing the seeds (*spores*) in a soil composed of peat, loam, and sand.

ACROSTICHUM, Linnæus (from the Greek '*ακρος*, "highest," and *στιχος*, "order," with reference to the lines on their leaves). Acrostic Fern. *Cryptogamia Filices*, Linnæus; *Polypodaceæ*, R. Brown. The capsules irregular, scattered on a part of, or all over, the under surface of the leaf; the envelop wanting. Linnæus was not acquainted with the structure of the capsules, or their disposition in the young state.

I.

LEAF (*Frond*) SIMPLE AND UNDIVIDED.

1. Citron-leaved Acrostic Fern (*A. citrifolium*, Linnæus). Leaves lance-shaped, egg-oblong, quite entire, shoot climbing. A native of America. Propagated by division in peaty soil.
2. Halbert Acrostic Fern (*A. hastatum*, Linnæus). Leaves simple, erect, flat, with the edges rolled in, green and naked above, beneath covered with dense, rather rigid, short hairs, and ash-coloured. A native of Japan. Propagated by division in peaty soil.
3. Diverse-leaved Acrostic Fern (*A. heterophyllum*, Linnæus). Leaves quite entire, smooth-stalked; barren ones roundish; fertile ones line-like, with the whole under part covered with capsule groups; shoot parasitical, thread-formed, long, creeping, with few branches. A native of the East Indies and Africa, in woods. Propagated by division in peaty soil.
4. Lance-leaved Acrostic Fern (*A. lanceolatum*, Linnæus). Leaves line-like, lance-shaped, egg-oblong, the whole of the lower surface crowded with elevated, golden capsule groups; shoot climbing. A native of the East Indies and Cochin China; found sticking to trees. Propagated by division in peaty soil.
5. Punctated Acrostic Fern (*A. punctatum*, Linnæus). Leaves heart-tongued, tapering to a point, quite entire, rather dotted above; leaf-stalk naked, rather quadrangular. A native of China. Propagated by division in peaty soil.
6. Spiked Acrostic Fern (*A. spicatum*, Linnæus). Leaves simple, stalked, spear-shaped, a foot long, upright, smooth, with a strong mid-rib, which is a continuation of the leaf-stalk; capsule-groups very numerous and minute, egg-oblong, shining, pale yellow. Found in the island of Mauritius. Propagated by division in peaty soil.

II.

LEAF SIMPLE, DIVIDED.

7. Elk's Horn Acrostic Fern (*A. alcicorne*, Swartz). The barren leaves kidney-shaped, somewhat lobed, entire, horizontal; fertile leaves upright, hand-shaped, bearing capsules on the segments. A native of New South Wales. Propagated by division in sandy peat.
8. Austral Acrostic Fern (*A. australe*, Linnæus). Leaf-stalks naked, quite smooth, forked at the top, with five or six awl-shaped rays, and fruiting from the sides. In the isle of France and Bourbon. Propagated by division in peaty soil.
9. Forked Acrostic Fern (*A. dichotomum*, Linnæus). Stem forked; spikes on one side, ascending, bent back, and flattish. A native of China and the Society Islands. Propagated by division in peaty soil.
10. Fringed Acrostic Fern (*A. digitatum*, Linnæus). Leaves several in a bundle, consisting of nine line-like, blunt, erect, leaflets, almost equal, hardly so thick as a wheat straw, covered all over the inner side with fructifications; and, when these are not visible, the plant has the air of a *fucus*. A native of Ceylon. Propagated by division in peaty soil.
11. Rusty Acrostic Fern (*A. ferrugineum*, Linnæus). Leaves many cleft; the segments line-like, pointed, quite entire, spreading, joining at the base; leaf-stalk naked, smooth. Propagated by division in peaty soil.
12. Comb-toothed Acrostic Fern (*A. pectinatum*, Linnæus). Leaf-stalk naked, perfectly simple; spike crescent-shaped on one side, ascending, flattish. A native of the Cape of Good Hope. Propagated by division in peaty soil.
13. Polypodian Acrostic Fern (*A. polypodioides*, Linnæus). Leaves many-cleft, alternate, and oblong, the back of the leaf hoary, scaly, with the capsule groups more or less confluent. A native of Jamaica and Virginia. Propagated by division in peaty soil.

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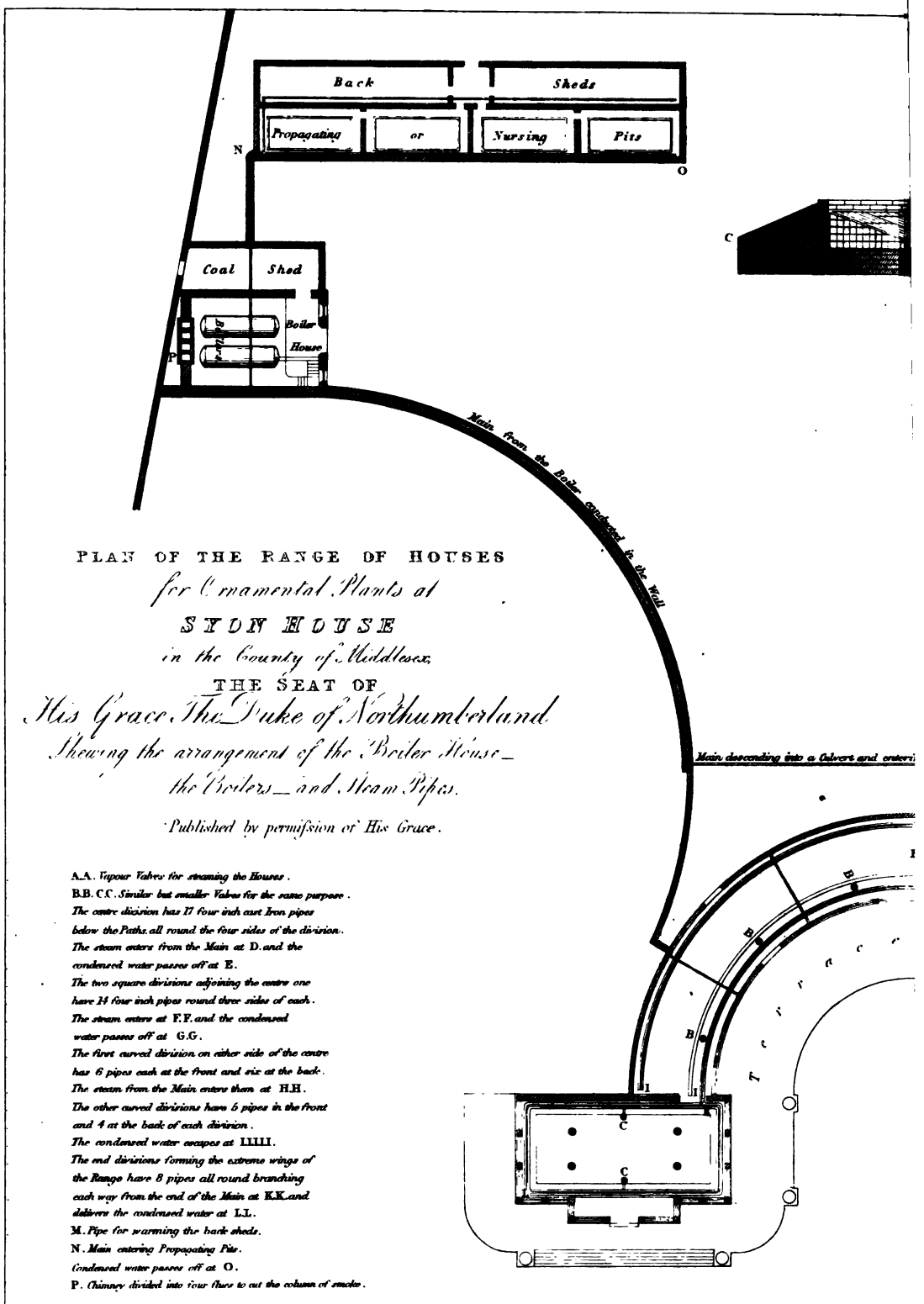

PLAN OF THE RANGE OF HOUSES

for Ornamental Plants at

SYON HOUSE

in the County of Middlesex,

THE SEAT OF

His Grace The Duke of Northumberland

Shewing the arrangement of the Boiler House the Boilers and Steam Pipes.

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A.A. *Vapour Valves for steaming the Houses.*
B.B. C.C. *Similar but smaller Valves for the same purpose.*
The centre division has 11 four inch cast Iron pipes
below the Paths all round the four sides of the division.
The steam enters from the Main at D. *and the*
condensed water passes off at E.
The two square divisions adjoining the centre one
have 14 four inch pipes round three sides of each.
The steam enters at F.F. *and the condensed*
water passes off at G.G.
The first curved division on either side of the centre
has 6 pipes each at the front and six at the back.
The steam from the Main enters them at H.H.
The other curved divisions have 6 pipes in the front
and 4 at the back of each division.
The condensed water escapes at I.I.I.I.
The end divisions forming the extreme wings of
the Range have 8 pipes all round branching
each way from the end of the Main at K.K. *and*
delivers the condensed water at L.L.
M. *Pipe for warming the back sheds.*
N. *Main entering Propagating Pits.*
Condensed water passes off at O.
P. *Chimney divided into four flues to cut the column of smoke.*

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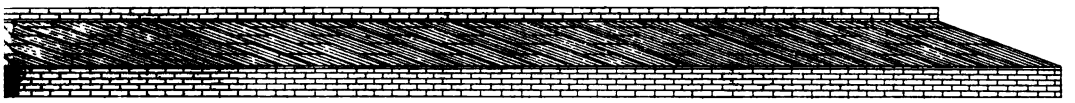

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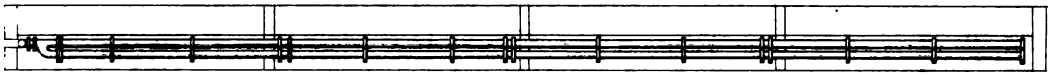

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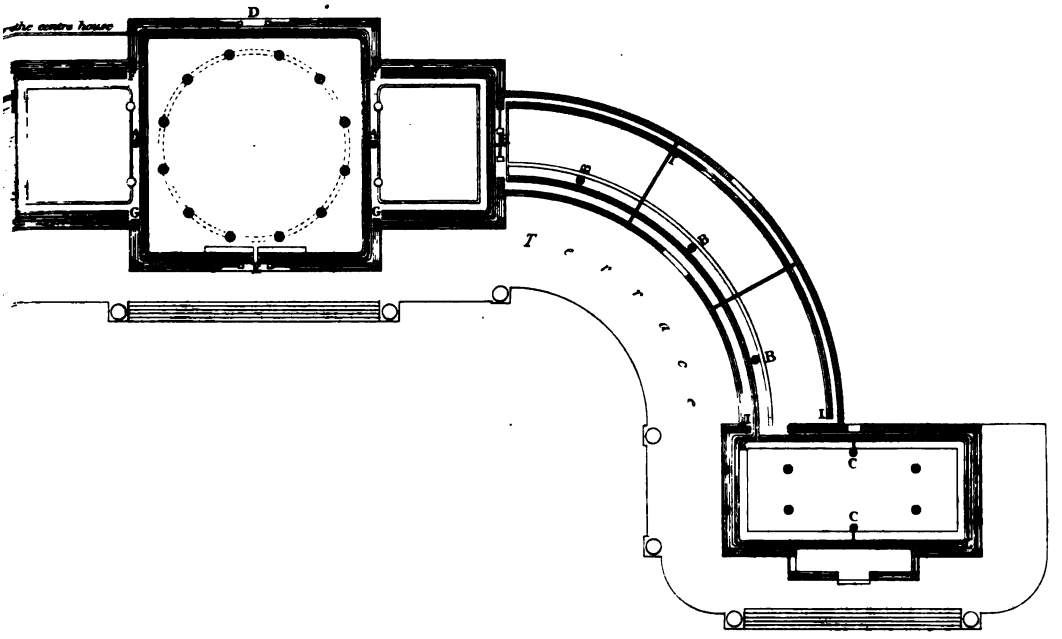

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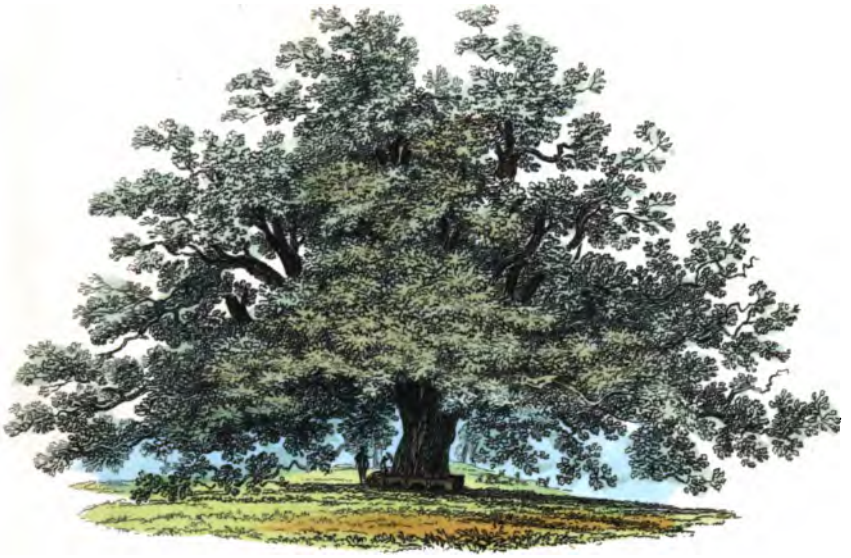

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III.

LEAF WINGED.

14. Stemarian Acrostic Fern (*A. Stemaria*, Beauvois). A parasitic species, from Guinea in 1823. Propagated in peaty soil by division.

15. Areolate Acrostic Fern (*A. areolatum*, Linnæus). The little capsule groups are divided into phalanxes by the longitudinal riblets of the leaf, and are disposed in several parts transversely on each side. A native of Virginia and Maryland. Propagated by division in peaty soil.

16. Golden Acrostic Fern (*A. aureum*, Linnæus). Leaves winged; wings alternate, tongue-shaped, quite entire, smooth, about twenty, rather leaf-stalked, a foot and a half long, and bluntish; stems in bundles, of a very dark colour, smooth, about nine feet high, the thickness of the little finger. A native of the West Indies and the Society Isles. Propagated by division in peaty soil.

17. Margined Acrostic Fern (*A. marginatum*, Linnæus). The leaf-wings oblong, entire, waved, tapering to a point; stem naked. Martyn says it is a sterile *Pteris grandifolia*.

18. Broad-ribbed Acrostic Fern (*A. platyneuron*, Linnæus). Stalks naked, alternate, a palm in height; leaves winged; wings blunt, quite entire, oblong, sitting at the base; the white part of the back of the leaf having a rusty dust sprinkled over it. A native of Virginia. Propagated by division in peaty soil.

19. Rufous Acrostic Fern (*A. rufum*, Linnæus). The leaf-wings egg-oblong, quite entire, downy; stem twenty inches high, covered with rusty hair; leafy almost from the root. A native of Jamaica. Propagated by division in peaty soil.

20. Sacred Acrostic Fern (*A. sanctum*, Linnæus). Leaves many-winged, spear-shaped; wings line-like, spear-shaped, saw-toothed, the lower saw-teeth largest; propagated by division in peaty soil. *Polypodium sanctum*, Swartz, Prodr. 133.

21. Dotted Acrostic Fern (*A. stigmaticum*). Leaflets alternate, spear-shaped, quite entire, the lowest eared, the upper ones decurrent, the upper surface dotted, and smooth. A native of the Isle of Bourbon. Propagated by division in peaty soil.

IV.

LEAF SOMEWHAT WINGED.

22. Thalictric Acrostic Fern (*A. thalictroides*, Linnæus). Leaves alternate, on each side many cleft, the barren ones broader. A native of Ceylon. Propagated by division in peaty soil.

23. Podded Acrostic Fern (*A. siliquosum*, Linnæus). Leaflets alternate, winged upwards, line-like, the lower ones two-parted. A native of Ceylon.

[These two last are supposed by König to be the same species.]

V.

LEAF DOUBLY WINGED.

24. Needle Acrostic Fern (*A. aculeatum*, Linnæus). Leaves supra-decomposite, wings twice cleft, stalks prickly. Swartz says it is a species of *Trichomanes*. Propagated by division in peaty soil.

25. Barbary Acrostic Fern (*A. Barbarum*, Linnæus). Leaf doubly winged; leaflets spear-shaped, blunt, saw-toothed, without footstalks, alternate; stalks smooth, two or three feet high, upright. A native of Africa. Propagated by division in peaty soil.

26. Cross Acrostic Fern (*A. cruciatum*, Linnæus). Leaf spear-shaped; leaflets without foot-stalks, each many cleft, slightly saw-toothed to the very middle rib, the lowest shortest, eared on both sides; stalks in a bundle, smooth, yellowish, with tiled scales at the base. Propagated by division in peaty soil.

27. Grass-like Acrostic Fern (*A. graminoides*, Linnæus). Leaves naked, line-like, somewhat forked, and capsule-bearing at the tip. A native of Jamaica. Propagated by division in peaty soil.

28. Broad-leaved Acrostic Fern (*A. latifolium*, Swartz). Leaves with leaf-stalks, broad, spear-shaped, very smooth, entire, margined; the fertile ones egg-oblong, spear-pointed; shoots creeping. A native of Jamaica. Propagated by division in peaty soil.

29. Mossy Acrostic Fern (*A. muscosum*, Swartz). The leaves with footstalks, entire, scaly; the barren ones oblong-spear-shaped, blunt; the fertile ones line-like and spear-shaped. A native of Jamaica. Propagated by division in peaty soil.

30. Saw-toothed Acrostic Fern (*A. serrulatum*, Swartz). Leaves line-like, toothed, capsule-bearing at the tip; shoots very short, rooting. A native of Jamaica. Propagated by division in peaty soil.

31. Simple Acrostic Fern (*A. simplex*, Swartz). Leaves entire, smooth, with foot-stalks; the barren ones spear-shaped, and tapering to a point; the fertile ones line-like, and spear-shaped. A native of Jamaica Propagated by division in peaty soil

32. Brimstone Acrostic Fern (*A. sulphureum*, Swartz). Leaves doubly winged; wings alternate, egg-oblong, wing-cut; leaflets bent back and saw-toothed. A native of Jamaica. Propagated by division in peaty soil.

33. Velvet Acrostic Fern (*A. villosum*, Swartz). Leaves broad, spear-shaped, somewhat notched, velvety on both sides. A native of Jamaica. Propagated by division in peaty soil.

34. Viviparous Acrostic Fern (*A. viviparum*, Linnæus). Leaf egg-oblong, with an angular stalk; leaflets on one side of the leaf, twin, equal; lower leaflets wing-cut; upper leaflets forked; uppermost quite simple and awl-shaped; the fructification breaking out from the inner edge of the divisions in an oblong spot, which is gradually dilated over the whole under surface of the leaf. A native of the Isles of France and Bourbon. Propagated by division in peaty soil. [G. L.]

ACROTHAMNIUM, Nees. A genus arranged by Fries under *Mycelia*.

ACROTRICHE, R. Brown (from the Greek, '*ακρος*, "a point," and *θριξ*, "hair"). Hair-point Flower. *Pentandria Monogynia*, Linnæus; *Epacrideæ*, Jussieu. Calyx furnished with flower-scales; corolla tubular, funnel-shaped, bearded within; filaments adhering to the tube; fruit five-seeded.

1. Heart Hair-point Flower (*A. cordata*, R. Brown). An ornamental, evergreen, greenhouse shrub, six inches high, from New Holland in 1823: leaves heart-egg-oblong, alternate, stalked, streaked beneath; flowers, from April till July, white; propagated by cuttings in sandy peat. *Styphelia cordata*, Labillardiere, N. H. I. 63.

2. Depressed Hair-point Flower (*A. depressa*, R. Brown). A shrub of New Holland: stem depressed; leaves rather heart-egg-oblong, stiff-pointed, bent back, convex above, veiny beneath; propagated by cuttings in sandy peat. *Styphelia depressa*, Sprengel.

3. Divaricate Hair-point Flower (*A. divaricata*, R. Brown).

An ornamental, evergreen, stove shrub, six inches high, from New Holland in 1824: stem much branched; leaves lance-shaped, stiff-pointed, straggling; flowers, in May, white, in axillary spikes; propagated by cuttings in sandy peat. *Styphelia divaricata*, Sprengel.

4. Oval-leaved Hair-point Flower (*A. ovalifolia*, R. Brown). An ornamental, evergreen shrub, six inches high, from New Holland in 1823: leaves egg-oblong, smooth; flowers, from April to August, white, in axillary spikes; fruit cellular; propagated by cuttings in sandy peat. *Styphelia ovalifolia*, Sprengel.

5. Spreading Hair-point Flower (*A. patula*, R. Brown). A shrub from New Holland: branches straggling; leaves oblong, tapering, sword-pointed; flowers on axillary stalks; propagated by cuttings in sandy peat. *Styphelia patula*, Sprengel.

6. Branched Hair-point Flower (*A. ramiflora*, R. Brown). A shrub from New Holland: leaves line-like, sword-pointed, very spreading, ribbed beneath; flowers in branched spikes; propagated by cuttings in sandy peat. *Styphelia ramiflora*, Sprengel.

7. Serrulate Hair-point Flower (*A. serrulata*, R. Brown). A shrub from New Holland: leaves line-like, saw-toothed, notched, fringed, striped; flowers on axillary stalks; propagated by cuttings in sandy peat. *Styphelia serrulata*, Labillardiere. [A. C.]

ACTÆA, Linnæus (from the Greek, '*ακταια*, "an elm"). Elm Wort. *Polyandria Monogynia*, Linnæus; *Ranunculaceæ*, Jussieu. Calyx with four regular leaves, at length falling off; corolla with four regular petals; stamens numerous, the anthers turned inwards; pistil simple; seed-organ one-celled, containing many seeds, on a longitudinal line; fruit, a fleshy indehiscent berry.

1. White Elm Wort (*A. Americana*, Pursh). An ornamental, hardy, deciduous perennial, three feet high, from North America: leaves doubly in threes; flowers, from April to June, white, in egg-oblong clusters; petals shorter than the stamens; berries white, egg-oblong; propagated by dividing the root in peaty soil.—Corn. Can. T. 77.

2. Snake Root (*A. racemosa*, Linnæus). Said to be *alexipharmic*.

3. Red Elm Wort (*A. rubra*, Willdenow). An ornamental, hardy, deciduous perennial, three feet high, from North America: flowers, in May and June, red; berries red; propagated by dividing the roots in peaty soil.

4. Herb Christopher, or Bane Berries (*A. spicata*, Linnæus). A deciduous British perennial, three feet high, found in moist woods; leaves doubly or triply in threes; flowers, from April to June, white, in an egg-oblong cluster; petals the length of the stamens; berries roundish, poisonous. [G. L.]

ACTEGETON, Blume (from the Greek, '*ακτις*, "a ray," and *γειτων*, "near"). Ray Shrub. *Diœcia Tetrandria*, Linnæus; *Celastrineæ*, Jussieu. Calyx pitcher-shaped, four-toothed; petals four; stamens four, alternate with the petals; anthers incumbent; seed-organ one-celled; nascent seeds, four; stigmas two; berry one to three-seeded.

1. Running Ray Shrub (*A. sarmentosa*, Blume). A straggling stove shrub from Java: stem sending out runners; prickles in pairs, axillary; leaves opposite, egg-oblong, sword-pointed, without leaf-stalks; flowers small, in axillary and terminal clusters; propagated by cuttings in common soil. [A. C.]

ACTINANTHUS, Ehrenberg (from the Greek, '*ακτις*, "a ray," and *ανθος*, "a flower"). Ray-flower. *Monœcia*, Linnæus; *Umbelliferæ*, Jussieu. A genus, from its fruit between *Eryngium* and *Œnanthe*, and from its inflorescence, analogous to *Echinophora*.

1. Syrian Ray-flower (*A. Syriacus*, Ehrenberg). A stiff-angled plant of Syria: leaves thrice or twice-winged; calyx toothed, persistent; flowers white; petals oblong; no umbel-fence; umblet-fence many-leaved. [A. C.]

ACTINELLA, Pursh. A genus arranged by Sprengel under *Helenium*, and by Lagasca under *Eriophyllum*.

ACTINOCARPUS, R. Brown (from '*ακτις*, "a ray," and *καρπος*, "fruit"). Ray Wort. *Hexandria Polygynia*, Linnæus; *Alismaceæ*, Jussieu. Blossom six-parted; calyx of three rather persistent leaves; petals three; stamens six; seed-organs six to eight, conjoined at the base; two-seeded; capsules star-like above.

1. Common Ray Wort (*A. Damasonium*, R. Brown). An ornamental, British, water perennial, six inches high, not uncommon in ditches; leaves oblong, heart-shaped; flowers, from June to August, white; fruit six-cleft. *Alisma Damasonium*, Linnæus.—Eng. Bot. 1615.

2. Minor Ray Wort (*A. minor*, R. Brown). An ornamental, greenhouse, water perennial, six inches high, from New Holland: leaves three-ribbed; flowers, from May till August, white; fruit eight-cleft; propagated by seeds in sandy loam. [G. L.]

ACTINOCHLOA, Willdenow. A genus of grasses arranged by Kunth under *Chondrosium*, &c.

ACTINOCLADIUM, Ehrenberg (from the Greek, '*ακτις*, "a ray," and *κλαδος*, "branchlet"). Ray Branch Mould. *Cryptogamia Fungi*, Linnæus; *Hyphomycetes Dematiei*, Fries. Flocks solid, cylindrical, transparent, rigid, with the tip definitely partitioned; spore-cases simple, and at length scattering.

1. Small Ray Branch Mould (*A. minimum*, Montagu). With sparsely scattered dark fibres, tip cleft, spore cases white. The black fibres can hardly be discerned with the naked eye, but are very apparent when closely observed with a compound microscope; the tip two-forked. Found upon the decayed leaves of various species of the *Arum*, in the south of France.

2. Pencilled Ray Branch Mould (*A. penicillum*, Schwein). With black, scattered, bundled fibres in the form of an orb; tip hair pencilled; spore-cases olive-coloured. Found upon the green leaves of the *Laurus Sassafras* in Carolina.

3. Rosy Ray Branch Mould (*A. rhodosporum*, Ehrenberg). With sparse dark fibres, three-cleft at the tip; spore-cases violet, rose-coloured; the dark fibres are persistent, but the spore-cases are of short duration. Found upon the trunk of the maple. [N. F.]

ACTINOMERIS, Nuttal (from the Greek '*ακτις*, "a ray," and *μερις*, "part"). Ray Flower. *Syngenesia Frustranea*, Linnæus; *Compositæ Helianthea*, Jussieu. A genus separated from *Coreopsis*.

1. Winged Ray Flower (*A. alata*, Sweet). An ornamental, hardy, deciduous perennial, three feet high, from North America in 1803: flowers, in July and August, yellow: propagated by division in peaty loam. *Coreopsis alata*, Cavanilles, Icon. III. 260.

2. Helianthan Ray Flower (*A. helianthoides*, Nuttal). An

ornamental, hardy, deciduous perennial, three feet high, from North America in 1825 : flowers, from July till August, yellow; propagated by division in peaty soil.

3. Tall Ray Flower (*A. procera*, Nuttal). An ornamental, hardy, deciduous perennial, eight feet high, from North America in 1766 : flowers, from September to October, yellow; propagated by division in peaty soil. *Coreopsis procera*, Hort. Kew.

4. Alternate-leaved Ray Flower (*A. squarrosa*, Nuttal). An ornamental, hardy, deciduous perennial, three feet high, from North America in 1640 : flowers, from July till August, yellow; propagated by division in peaty soil. *Verbesina Coreopsis*, Michaux.

[G. L.]

ACTINOPHYLLUM. A genus arranged under *Sciodaphyllum*, Brown. [A. C.]

ACTINOTHYRIUM, Kunze (from the Greek, '*ακτὶν*, " a ray," and *θυρίον*, " a doorlet"). Ray Rust. *Cryptogamia Fungi*, Linnæus; *Pyrenomycetes Xylomacei*, Fries. Buckler-like, with ray-like fibres covering the spindle-shaped spore cases.

1. Grass Ray Rust (*A. graminis*, Kunze). Gregarious or scattered on the straw of grasses in spring; colour bluish.—Grev. Crypt. Fl. 218. [G. L.]

ACTINOTUS, Labillardière (from the Greek '*ακτὶν*, " a ray"). Ray-fence. *Pentandria Digynia*, Linnæus; *Umbelliferæ*, Jussieu. Calyx with five teeth; corolla wanting; stamens five to nine; pistils two, deeply cleft; capsule one-celled, one-seeded.

1. Sun-flower Ray-fence (*A. Helianthi*, Labillardière). An evergreen, greenhouse perennial, two feet high, from New Holland in 1821: leaves winged, downy; fence with ten to eighteen long soft rays; flowers, in June, white; propagated by division in sandy loam. *Eriocalia major*, Smith. —Bot. Reg. 644.

2. Smaller Ray-fence (*A. minor*, De Candolle). An annual of the eastern parts of New Holland: plant smooth; fence with nine or ten bristly rays. *Eriocalia minor*, Smith.—Smith, Ex. Bot. T. 79.

[G. L.]

ACTION. Among stablemen, a horse is said to have good, bad, high or low action, according to his mode of using the fore feet and legs in progression. A horse with good action moves steadily, with ease and regularity; sets the foot firmly, and nearly flatly, upon the ground, lifts it well up, and controuls its direction in the air with great precision. Bad action signifies any unpleasant deviation from good action, such as an irregular, careless, sluggish, or precipitate manner of moving the limbs. Low action is that in which the horse raises his foot but a little way from the earth, or, as it is commonly expressed, " he goes close to the ground." Such horses are usually regarded as very apt to stumble and fall; and, in general, they are so. High action is the reverse of that last mentioned, and is synonymous with the phrase " much knee action," as well as showy action, so called from the prancing, imposing gait of the animal. It is a common, but still an erroneous notion, that a horse is less likely to stumble in proportion to the height he raises his feet from the ground. Moderately high action is very desirable; but if it be too high, the animal not only takes more time to get over the same piece of ground, but he is sooner fatigued, and his fore feet and legs are sooner worn out than if his action had been lower. Besides, safety in progression does not altogether depend upon very high action: many horses with low action will pass over the roughest ground without making a single false step; while many others, with what would be called unexceptionable action, drop even on a smooth road. The difference is, that the one attends to his footsteps, and chooses a proper spot to rest upon, while the other pays not the slightest attention to the road, but throws down his foot as recklessly as if it were a lump of dead matter, not at all belonging to him. In choosing horses, therefore, it is advisable to watch the motion of the eye as well as of the foot, in order to form a proper judgment upon this important point.

The horse's action may be formed and modified by several circumstances. If, for instance, he spend the first years of his life upon smooth and soft ground, it is not likely that he will acquire a habit of attending to his steps, or yet of lifting his feet very high; but if he be trained or early worked, before his action be completely formed, upon rough stony ground, the frequent shocks he receives, and the little mistakes he makes, will early teach him to take better care in future. Age, fatigue, and disease exert considerable influence over action: but it is enough merely to mention these. The external conformation has also something to do with action; and in a few cases so has shoeing. See CUTTING, CLICKING, CONFORMATION, and PROGRESSION. [C. S.]

ACTION (*muscular*). The action of the muscles consists in their shortening themselves in the direction of their fibres. Hence their action is always in proportion to their length, that is to say, if one a foot long, produce a certain degree of motion by contracting three inches, then one two feet long would contract six inches, and produce twice the degree of motion.—See ANATOMY. [C. S.]

ACTIVE MOLECULES. In vegetable physiology, a term given by Mr. R. Brown to minute moving particles which he discovered first in organic, and afterwards in inorganic substances, leading to the belief (confessedly hypothetical) that all nature is alive. He made his primary observation and discovery from having occasion to immerse in water some particles of pollen, from the full grown anthers of *Clarkia pulchella*. He afterwards found similar moving particles in almost all substances, mineral as well as vegetable; and particularly remarked that the floating flue or soot from coal fires almost entirely consists of these. The smallest moving particles which he observed appeared to be spherical, or nearly so, and to be between 1-20,000th and 1-30,000th of an inch in diameter; though there were others of different size and shape with similar motions.

The discoverer is of opinion, that the motions of the particles are not occasioned by currents in the fluid containing them, nor by the intestine motion accompanying evaporation. This is proved by an ingenious experiment. Add to some almond oil a considerably smaller portion of water, duly impregnated with active molecules, and

shake or triturate the whole till there be produced drops of water of various sizes, from 1-50th to 1-2,000th of an inch in diameter. Some of these may be so small as to contain only one active molecule. Minute drops may in this manner be preserved for an hour or more, which, without the oil would be almost instantaneously dissipated. Now Mr. Brown found that in all the drops thus formed and protected from evaporation by the oil, the particles moved with undiminished activity. [B. E.]

ACULEATE (in Latin, *Aculeatus*). Prickly, as in the instance of the sweet briar (*Rosa rubiginosa*).

ACULEUS. A prickle arising from bark only, as in the bramble (*Rubus fruticosus*), which circumstance distinguishes it from a thorn (*spina*) arising from the wood.

ACUMINATE (in Latin, *Acuminatus*). Taper-pointed, as in the leaf of *Cerasus racemosa* and *Salix alba*.

ACUMINOSE (in Latin, *Acuminosus*). Ending in a flat, narrow point.

ACUTE (in Latin, *Acutus*). Sharp-pointed without tapering, as in the lilac leaf.

ACUTE-ANGULAR. Having angles less than a right angle.

ACUTE DISEASES. In veterinary surgery, disorders which run their course with great rapidity, and often with violence.

ACYNOS, Persoon (from the Greek, *ακυνος*, "a sort of thyme"). Basil Thyme. *Didynamia Gymnospermia*, Linnæus; *Labiatæ*, Jussieu. Calyx two-lipped, furrowed, hairy, velvety at the opening; corolla bulged at the opening, with the upper lip notched, the lower lip three-parted, the middle lobe entire, rather notched or nicked.

1. Alpine Basil Thyme (*A. alpinus*, Persoon). An ornamental, evergreen, frame perennial, six inches high, from Austria in 1731: leaves nearly blunt, roundish, concave, somewhat saw-toothed; flowers, from June till September, purple, in whirls of six flowers; propagated by seeds in sandy loam.—Jacq. Austr. I. 97.

2. Large-flowered Basil Thyme (*A. grandiflorus*, G. Don). An ornamental biennial, six inches high: flowers, in July and August, purple; propagated by seeds in sandy loam.

3. Strong-scented Basil Thyme (*A. graveolens*, Link). An ornamental, evergreen, under-shrub, one foot high, from the Crimea in 1820: stem branched and spreading; leaves roundish, pointed, somewhat saw-toothed, hairy at the end; flowers, from June till August, purple, in whirls; propagated by seeds in common soil.

4. Corsican Basil Thyme (*A. herba baroni*, G. Don). An ornamental, evergreen, under-shrub, one foot high, from Corsica in 1820: flowers, in July and August, purple; propagated by seeds in sandy loam.

5. Various-leaved Basil Thyme (*A. heterophyllus*, G. Don). An ornamental annual, six inches high, from Italy in 1822: flowers, in June and July, purple; propagated by seeds in common soil.

6. Patavine Basil Thyme (*A. Patavinus*, Persoon). An ornamental, deciduous biennial, nine inches high, from the south of Europe in 1776: leaves egg-oblong, somewhat saw-toothed; stem ascending; flowers, from June till August, flesh-coloured, in whirls of six to ten flowers; propagated by seeds in sandy loam.—Bot. Mag., 2153.

7. Purplish Basil Thyme (*A. purpurascens*, Persoon). An ornamental, deciduous biennial, six inches high, from Spain in 1820: flowers, in June and July, purple; propagated by seeds in common soil.

8. Round-leaved Basil Thyme (*A. rotundifolius*, Persoon). An ornamental, evergreen, under-shrub, six inches high, from Spain in 1820: flowers, in June and July, purple; propagated by seeds in common soil.

9. Sweet-scented Basil Thyme (*A. suaveolens*, G. Don). An ornamental annual, one foot high, from Greece in 1817: flowers, in July and August, purple red; propagated by seeds in sandy loam.

10. Velvety Basil Thyme (*A. villosus*, Persoon). An ornamental annual, six inches high, from Germany in 1817: stem much branched; leaves egg-oblong; flowers, in July and August, red; propagated by seeds in common soil.

11. Common Basil Thyme (*A. vulgaris*, Persoon). An ornamental British annual, six inches high: stem erect, branched at the base; leaves egg-oblong, pointed, saw-toothed forwards; flowers, from June till August, violet purple, in whirls of six flowers; propagated by seeds in common soil.—Eng. Bot., 411. [G. L.]

ADAMBEA, De Candolle. 1. The third section of the genus *Lagerstræmia*. 2. The Malabar name of the *Lagerstræmia Reginæ*. 3. Also the *Impomæa campanulata*. [A. C.]

ADAMIA, Wallich (named from Dr. J. Adam, Calcutta). Adam's Flower. *Didynamia Angiospermia*, Linnæus; *Araliaceæ*, Jussieu. A new genus established by Dr. Wallich in his "*Plantæ Asiaticæ*."

1. Blue Adam's Flower (*A. cyanea*, Wallich). An ornamental, evergreen, bark-stove shrub, from the East Indies in 1829: propagated by cuttings in peaty loam.—Wallich, T. 26. [G. L.]

ADAM'S APPLE (*Musa paradisiaca*). So named by the old botanists, who supposed it to be the forbidden fruit.

ADAMSIA. A generic name given to *Puschkinia*, and to a species of *Sieversia*. [A. C.]

ADAM'S NEEDLE (*Yucca*). [B. E.]

ADANSONIA, Linnæus (named from the French botanist, Adanson). Baobab. *Monadelphia Polyandria*, Linnæus; *Bombaceæ*, Jussieu. Calyx naked, deciduous, five-parted; petals five, at the middle almost conjoined; style of the pistil very long; summits many; capsule woody, ten-celled; cells many seeded, filled with a soft farinaceous pulp around the seeds.

1. Baobab Tree (*A. digitata*, Linnæus). A bark-stove tree, thirty-feet high, from Guinea in 1724: trunk about twenty-five feet in diameter; flowers white, drooping; stamens numerous; propagated by cuttings in peaty loam. *Monkey-bread*, *Sour-gourd*, and *Baobab*. *A. Baobab*, Gærtner.—Bot. Mag. 2791, 2. [G. L.]

ADATINAN. A species of *Lecythis*.

ADDER'S TONGUE. The genus *Ophioglossum*.

ADDAGE. A provincial term for AFTER-GRASS, chiefly used in Derbyshire and the midland counties.

ADDER-STUNG. In veterinary surgery, a term most absurdly applied to all injuries arising to horses and cattle from venomous animals. Mr. Taplin has committed some very gross mistakes on this subject, by confounding the venomous adder or viper (*Viperus communis*), which does not sting, but bites, with the innocent slow-worm

(*Anguis fragilis*), and even with the eft (*Triton palustris*); and, adopting a popular prejudice, calls dragon-flies *horse-stingers*, though it is very certain that they possess no sting, and cannot do the slightest injury to any animal larger than the insects on which they feed.

The bite of the viper is the only serious injury that can arise from venomous animals in this country; and this when discovered early, ought to be instantly cupped with a large cupping-glass, followed by fomentations of warm vinegar. White also recommends the application of an aqueous solution of sal ammoniac, or of sugar of lead water, with the addition of a little camphorated spirit. [B. E.]

Blaine, in his *Canine Pathology*, makes the following judicious remarks on the bite of the adder in dogs:—

"In every quarter of the globe but Europe," he says, "dogs are exposed to the venomous attacks of snakes, whose bite is instantly mortal. The viper is the only animal of this kind in Britain capable of inflicting a wound attended with serious consequences, and to which dogs become exposed when hunting. In these cases the bitten part swells enormously, and the animal expresses great distress and suffering; at length he becomes affected with torpor, or, in some cases, with convulsions, when death commonly ensues. But it is not often that these bites are fatal, particularly when proper means are resorted to for obviating their effects. These means consist in freely rubbing the bitten part with volatile alkali (*spirit of hartshorn*), or with the spirit of hartshorn mixed with oil; giving, also, seven, ten, or twelve drops of the volatile alkali, or, otherwise, forty drops of the spirit of hartshorn in a teaspoonful or two of sweet oil every hour until the amendment is evident." [C. S.]

ADDUCTORES, Hedwig (from the Latin, *ad*, "to," and *ductor*, "leader"). The sperm organs (*pistillidia*, Agardh) of mosses.

ADELIA, Linnæus (from the Greek *α*, privative, and *δηλος*, "visible"). Bernard's Flower. *Diœcia Monadelphia*, Linnæus; *Euphorbiaceæ*, Jussieu. Male flowers with the calyx five-parted; concave; no corolla; female flowers with the calyx five-parted; no corolla; pistils three, as if torn; capsule three-celled; cells one-seeded.

1. Box-leaved Bernard's Flower (*A. acidoton*, Linnæus). An evergreen, bark-stove shrub, three feet high, from the West Indies in 1768: leaves oblong, blunt, entire, fascicled; thorns axillary; flowers in June and July, greenish-white; propagated by seeds in peaty loam.

2. Velvet-leaved Bernard's Flower (*A. Bernardia*, Linnæus). An evergreen, bark-stove shrub, six feet high, from Jamaica in 1768: leaves oblong, downy, saw-toothed; flowers, in July and August, green; propagated by seed in peaty loam.

3. Martius' Bernard's Flower (*A. Martii*, Sprengel). A native of Brazil: leaves oblong-lance-shaped, saw-toothed, leathery, shining above, white beneath; flowers in axillary heads.

4. Myrtle-leaved Bernard's Flower (*A. myrtifolia*, Ventenat). The native country unknown: branches rounded and smooth; leaves egg-oblong, pointed, notched, fringed, and smooth.

5. Nerium-leaved Bernard's Flower (*A. neriifolium*, Rothburg). A native of the East Indies: branches downy; leaves line-like, entire, with rusty spots beneath; flowers in axillary spikes.

6. Smooth-leaved Bernard's Flower (*A. Ricinella*, Linnæus). An evergreen, bark-stove shrub, six feet high, from Jamaica in 1768: leaves inversely egg-oblong, entire; flowers, from June till August, green; propagated by division in peaty loam. [G. L.]

ADELOBOTRYS, De Candolle (from the Greek, *αδηλος*, "obscure," and *βοτρυς*, "a cluster;" the flowers not being well known). Cluster-flower. *Decandria Monogynia*, Linnæus; *Melastomaceæ*, Jussieu. Calyx free, rather bell-shaped, with five short blunt teeth; five oval petals; anthers forked; seed-organ and style unknown.

1. Climbing Cluster-flower (*A. scandens*, De Candolle). A climbing stove shrub of Guiana: branches rounded; leaves five-ribbed, egg-heart-shaped, taper-pointed, on leaf-stalks; flowers white, in clusters at the tops of the branches; propagated by cuttings in sand, peat, and loam. *Melastoma scandens*, Aublet; *Rhexia scandens*, Richard. [A. C.]

ADELPHIA (from the Greek, *'αδελφος*, "brother"). Brotherhood; applied in naming the Linnæan classes to the parcels of the stamens, as *Monadelphia*, "one brotherhood;" *Polyadelphia*, "many brotherhoods," that is, parcels of stamens. [B. E.]

ADENANDRA, Willdenow (from the Greek, *'αδην 'ανδρος*, "gland of the stamen"). Stamen-gland. *Pentandria Monogynia*, Linnæus; *Rutaceæ*, Jussieu. Calyx five-parted; petals and stamens arising from the calyx; stamens ten, the five opposite the petals barren, each ending in a thick gland, the other five shorter, with large egg-oblong anthers, each anther with a gland at the tip.

I.

FLOWERS ALMOST WITHOUT FLOWER-STALKS.

1. Taper-pointed Stamen-gland (*A. acuminata*, Sweet). An ornamental, evergreen, greenhouse shrub, two feet high, from the Cape of Good Hope in 1812: leaves scattered, roundish egg-oblong, rather heart-shaped, taper-pointed, fringed; flowers, from April till July, white; propagated by cuttings in peaty loam. *Diosma acuminata*, Loddiges; *Agathosma acuminata*, Willdenow; *Bucco acuminata*, Wendland.—Bot. Cab. 493.

2. Pleasing Stamen-gland (*A. amœna*, Sweet). An ornamental, evergreen, greenhouse shrub, two feet high, from the Cape of Good Hope in 1798: leaves scattered, oblong or oval, bluntish, smooth, dotted beneath; flowers, from April till July, whitish above, reddish beneath, without flower-stalks, solitary, terminal; propagated by cuttings in peaty loam. *Diosma amœna*, Loddiges.—Bot. Reg. 553.

3. Two-rowed stamen-gland (*A. biseriata*, Meyer). A greenhouse shrub, one to two feet high, from the Cape of Good Hope: leaves crowded, oblong, rough from two rows of glands beneath; flowers large, smooth, pink? *Diosma biseriata*, Sprengel.

4. Leathery Stamen-gland (*A. coriacea*, Lichtenstein). An ornamental, evergreen, greenhouse shrub, two feet high, from the Cape of Good Hope in 1720: leaves scattered, oblong, blunt, smooth; flowers, from April till July, pink, large, solitary on the tops of the branches; propagated by cuttings in peaty loam. *Diosma coriacea*, De Candolle.

5. Pointed-leaved Stamen-gland (*A. cuspidata*, Meyer). An ornamental greenhouse shrub, one to two feet high, from the Cape of Good Hope: leaves crowded, upper ones very closely tiled, egg-oblong, taper-pointed, smooth; flowers, from April to July, pink; propagated by cuttings in peaty loam. *Diosma cuspidata*, Sprengel.

6. Showy Stamen-gland (*A. speciosa*, Link). An ornamental, evergreen, greenhouse shrub, two feet high, from the Cape of Good Hope in 1790: leaves scattered, oblong, or inversely egg-oblong, dotted beneath, slightly fringed; flowers, from April till July, pink; propagated by cuttings in peaty loam. *Diosma speciosa*, Sims; *Diosma cistoides*, Lamarck.—Bot. Mag. 1271.

7. Umbelled Stamen-gland (*A. umbellata*, Willdenow). An ornamental, evergreen, greenhouse shrub, two feet high, from the Cape of Good Hope in 1790: leaves oblong, smooth, fringed; calyx smooth; flowers, from April till July, pink, in terminal umbels; propagated by cuttings in peaty loam. *Glandulifolia umbellata*, Wendland, Delaune; *Hartogia umbellata*, Bergius.—Wend. C. I. 10.

8. One-flowered Stamen-gland (*A. uniflora*, Willdenow). An ornamental, evergreen, greenhouse under-shrub, one foot high, from the Cape of Good Hope in 1775: leaves scattered, dotted beneath, lance-shaped, smooth; calyx fringed; flowers, from April till July, pink, terminal, solitary; propagated by cuttings in peaty loam. *Diosma uniflora*, Linnæus.—Bot. Mag. 273.

9. Villous Stamen-gland (*A. villosa*, Lichtenstein). An ornamental, greenhouse shrub, one to two feet high, from the Cape of Good Hope in 1786: leaves crowded, egg-oblong, fringed, downy and glandular beneath; flowers from April to July, pink, in terminal umbels; propagated by cuttings in peaty loam. *Diosma villosa*, Thunberg; *Hartogia villosa*, Bergius.

II.

FLOWERS ON LONG FLOWER-STALKS.

10. Fragrant Stamen-gland (*A. fragrans*, Rœmer). An ornamental, evergreen, greenhouse shrub, one to two feet high, from the Cape of Good Hope in 1812: leaves egg-oblong, glandular, scattered; flower-stems glutinous, aggregate, terminal, twice as long as the leaves; flowers, from May till July, red, sweet-scented; propagated by cuttings in peaty loam. *Diosma fragrans*, Sims.—Bot. Mag. 1511.

11. Linear-leaved Stamen-gland (*A. linearis*, A. Jussieu). An ornamental greenhouse shrub, one foot high, from the Cape of Good Hope in 1800: leaves opposite, line-like; flowers, from April to July, white, terminal; propagated by cuttings in peaty loam. *Diosma linearis*, Thunberg.

12. Margined Stamen-gland (*A. marginata*, Rœmer). An ornamental, evergreen, greenhouse shrub, two feet high, from the Cape of Good Hope in 1806: leaves scattered, the lower egg-oblong, the upper lance-shaped; umbels terminal; flowers, from March till July, pink; propagated by cuttings in peaty loam. *Diosma marginata*, Thunberg.—Pluk. Al. 411, 3.

13. Rosemary-leaved Stamen-gland (*A. rosmarinifolia*, A. Jussieu). An ornamental greenhouse shrub, one to two feet high, from the Cape of Good Hope: leaves lance-shaped, line-like, smooth; flowers reddish, axillary, terminal; propagated by cuttings in peaty loam. *Diosma rosmarinifolia*, Lamarck. [G. L.]

ADENANTHERA, Linnæus (from the Greek ἀδήν, "a gland," ἀνθηρά, "an anther"). Anther-gland. *Decandria Monogynia*, Linnæus; *Leguminosæ*, Jussieu. Flowers hermaphrodite; calyx five-toothed; petals five, lance-shaped, sitting; stamens ten; anthers ending in a somewhat foot-stalked, deciduous gland; pod flattish, many-celled, membranaceous, somewhat twisted at the base of the seeds, and destitute of pulp; leaves doubly winged.

1. Bonpland's Anther-gland (*A? Bonplandia*, Kunth). A tree, twenty-five feet high, found in the moist shades of Caraccas, near Higuerote and Guriepe: leaves oblong, the under ones slightly downy; spikes in pairs, somewhat terminal.

2. Crosier Anther-gland (*A? circinnalis*, De Candolle). A tree, thirty feet high, found in the Moluccas: leaves egg-oblong, pointed, the under ones cottony; pods bent inwards, and crosier-shaped. *Clypearia rubra*, Rumphius.

3. Sickle Anther-gland (*A. falcata*, Linnæus) An ornamental, evergreen, bark-stove tree, sixty feet high, from the East Indies in 1812: leaves oval, decompound, somewhat pointed, downy underneath; pod straight; petals four, yellow; propagated by cuttings in sandy loam and peat.—Rumph. Amb. III. T. 111.

4. Peacock Anther-gland (*A. Pavonina*, Linnæus). A bark-stove tree, 100 feet high, from the East Indies in 1759: leaflets oval, blunt, smooth on both sides; pod sickle-shaped; flowers, from May till August, yellowish-white; propagated by cuttings in sandy loam and peat.—Jacq. C. IV. 23. [G. L.]

ADENANTHOS, Labillardiere (from the Greek, ἀδήν, "a gland," and ἄνθος, "a flower"). Gland-flower. *Tetrandria Monogynia*, Linnæus; *Proteaceæ*, Jussieu. Leaves scattered, simple in some, thread-shaped in others; compound flowers, some axillary, solitary, and red, others terminal; fence (*involucrum*), four to eight leaves, tiled and scaly; calyx tubular, with four divisions, each supporting a sitting anther, split laterally for the passage of a long style, and afterwards separating by a circular fissure into two portions, the lower surrounding the fruit, which is a bulging nut, with a single seed.

1. Wedge-shaped Gland Flower (*A. cuneata*, R. Brown). An ornamental, evergreen, greenhouse shrub, from New Holland in 1824: leaves wedge-shaped, toothed at the tip, ribless, rather silky; flowers red; propagated by cuttings in sandy peat and loam.—Labil. N. H. I. 38.

2. Egg-leaved Gland Flower (*A. obovata*, Labillardiere). An ornamental, evergreen, greenhouse shrub, five feet high, from New Holland in 1826: leaves inversely egg-oblong, entire, smooth, three-ribbed; flowers, from May till August, red; propagated by seeds in sandy peat.—Labil. N. H. I. 37.

3. Silky Gland Flower (*A. sericea*, Labillardière). An ornamental, evergreen, greenhouse shrub, from New Holland in 1824: leaves two to three divided, thread-shaped, silky; flower-stalks axillary, silky; pistil smooth; flowers red; propagated by cuttings in sandy peat and loam.—Labil. N. H. I. 38.

4. Terminal Gland Flower (*A. terminalis*, R. Brown). A shrub of New Holland: leaves three-parted, thread-shaped; flower-stalks terminal; pistil hairy. [G. L.]

ADENARIA, Humboldt (from ἀδήν, "a gland" the calyx, petals, and seed-organ being covered with glandular dots). Gland Dot. *Octo-Decandria Monogynia*, Linnæus; *Lythrarieæ*, Jussieu. Calyx bell-shaped, four or five-cleft; petals four or five, nail-shaped, inserted between the lobes of the calyx; stamens eight to ten, longer than the corolla; seed-organ two-celled; style shorter than the corolla; stigma two-lobed; fruit round; seeds

numerous, cornered; leaves opposite, entire, and are, as well as the calyx, petals, and seed-organ, beset with glandular dots.

1. Many-blossomed Gland Dot (*A. floribunda*, Humboldt). A stove tree, 20 feet high, from New Grenada; leaves oblong-lance-shaped, taper-pointed, upper surface smooth, under clothed with hoary down; flowers white, in umbels, on short flower-stalks; propagated by cuttings in peaty loam. *Antherylium floribundum*, Sprengel.

2. Grislean Gland Dot (*A. grisleoides*, Humboldt). A stove tree, twenty feet high, from South America; leaves oblong, taper-pointed, smooth; flowers white, in umbels, on short flower-stalks; glandular dots, red or brown; propagated by cuttings in loamy peat. *Antherylium grisleoides*, Sprengel.

3. Purplish-leaved Gland Dot (*A. purpurata*, Humboldt). A stove tree, twenty to thirty feet high, from New Grenada: leaves oblong, taper-pointed, purplish, smooth; the ribs and veins beneath downy; flowers white, in umbels, almost without flower-stalks: propagated by cuttings in loamy peat. *Antherylium purpuratum*, Sprengel. [A. C.]

ADENILEMA, Blume (from the Greek, ἀδήν, "a gland," and ἴλημι, "I am near;" glands on the calyx). Hair Gland, *Icosandria Monogynia*, Linnæus; *Spiræaceæ*, Jussieu. Calyx bell-shaped, five-cleft, covered outside with glandular hairs; petals five; stamens many, inserted with the petals into the calyx; one seed-organ; one style; capsule one-celled, eight to twelve-seeded; seeds one-ribbed.

1. Deceiving Hair Gland (*A. fallax*, Blume). A straggling stove shrub from Java: leaves alternate, heart-shaped, taper-pointed, three-lobed, deeply saw-toothed; flowers furnished with one flower-scale (*bractea*), in terminal panicles; propagated by cuttings in loam, peat and sand. [A. C.]

ADENOCARPUS, De Candolle (from the Greek, ἀδήν, "a gland," and καρπός, "a fruit," the pod being beset with glands). Gland Fruit. *Monadelphia Decandria*, Linnæus; *Leguminosæ*, Jussieu. Calyx inversely conical, often glandular, two-lipped, upper lip two-parted, lower longer, and three-parted; keel blunt; stamens monadelphous; pod oblong, plane, flattish, bearing little glands somewhat foot-stalked; leafits complicated; bunches terminal.

1. Leafy Gland Fruit (*A. foliosus*, De Candolle). An ornamental, evergreen, greenhouse shrub, six feet high, from the Canaries in 1629: calyx velvety, lower lip three-parted at the tip, segments equal; leaves and branchlets very crowded, rough; the young pod covered with a few glands, the old pod quite smooth; flowers, in May and June, yellow, standard downy; propagated by seeds in common soil. *Cytisus foliosus*, Aiton.—Bot. Mag., 42.

2. Frankenian Gland Fruit (*A. Frankenioides*, Choisy). An ornamental, greenhouse shrub, two feet high, from the Peak of Teneriffe in 1815: calyx glandular, downy, with the middle segment of the lower lip longer than the side ones; upper lip still longer; branches velvety; leaves very crowded, rough; flowers, from April till July, yellow, somewhat crowded; standard downy at the summit; propagated by cuttings in sandy loam. *A. anagyrius*, Sprengel; *Genista viscosa*, Willdenow.

3. Spanish Gland Fruit (*A. Hispanicus*, De Candolle). An ornamental, deciduous shrub, three feet high, from Spain in 1816: calyx glandular and velvety; lower lip with three somewhat equal segments, scarcely longer than the upper lip; branchlets rough; flowers, in June and July, yellow, crowded; standards rather smooth; propagated by seeds in common soil. *Cytisus Hispanicus*, Lamarck; *Cytisus anagyrius*, L'Heritier.

4. Intermediate Gland Fruit (*A. intermedius*, De Candolle). An ornamental, deciduous shrub, four feet high, from Sicily: calyx glandular, downy, with the middle segment of the lower lip longer than the lateral ones; upper lip longer above; branches velvety; flowers, in May and July, yellow, somewhat remote; standards rather smooth; propagated by seeds in common soil. *Cytisus complicatus*, Brotero.—Clus. Hist. I. f. 1.

5. Small-leaved Gland Fruit (*A. parvifolius*, De Candolle). An ornamental, deciduous shrub, four feet high, from the south of France in 1800: calyx glandular, somewhat downy, with the middle segment of the lower lip longer than the side ones, and much longer than the upper lip, branches smooth; flowers, from May till July, yellow, remote; standards downy; propagated by seeds in common soil. *Cytisus parvifolius*, Lamarck. Syns.;—*Cytisus divaricatus*, L'Heritier; *Cytisus complicatus*, De Candolle, Fl. Fr. 3821; *Spartium complicatum*, Loiseleur Deslongchamps.

6. Toulon Gland Fruit (*A. Telonensis*, De Candolle). An ornamental, deciduous shrub, three feet high, from the South of Europe in 1800: calyx not glandular, downy, with somewhat equal segments of the lower lip; upper lip a little longer; branchlets rather smooth; flowers, in June and July, yellow, remote; standards downy; propagated by seeds in common soil. *Cytisus Telonensis*, Loiseleur Deslongchamps; *Spartium complicatum*, Gouan, Syn. — Duh. Arb. V. T. 47, f. 2. [G. L.]

ADENODUS, Loureiro. A genus which appears to be the same as *Elæocarpus*.

ADENOPHORA, Fischer (from the Greek, ἀδήν, "a gland," φορέω, "I bear"). Gland Bell-flower. *Pentandria Monogynia*, Linnæus; *Campanulaceæ*, Jussieu. A genus separated from *Campanula*, on account of the glands with which they are furnished.

1. Common Gland Bell-flower (*A. communis*, Fischer). An ornamental, deciduous perennial, four feet high, from Siberia in 1810: flowers, from July till September, pale blue; propagated by division in peaty loam.

2. Buck's Horn Gland Bell-flower (*A. coronopifolia*, Fischer). A pretty deciduous perennial, one foot high, from Dahuria in 1822: flowers, in June and July, blue; propagated by division of the root in common soil. *Campanula coronopifolia*, Ruiz.—Sweet, Fl. Gar., 116.

3. Toothed Gland Bell-flower (*A. denticulata*, Fischer). An ornamental, deciduous perennial, one foot high, from Siberia in 1817: leaves stalkless, erect, egg-lance-shaped, stiff, deeply saw-toothed, smooth; flowers, in July and August, blue; propagated by division in peaty loam.—Sweet, Fl. Gar. 116.

4. Gmelin's Gland Bell-flower (*A. Gmelini*, Fischer). An ornamental, deciduous perennial, one foot and a half high, from Siberia in 1820: leaves line-like, smooth, stiff, the lower ones distinctly toothed; flowers, in May and July, pale blue; propagated by division in common soil. *Campanula Gmelini*, Sprengel.—Gmel. Sib. III., 33.

5. Fischer's Gland Bell-flower (*A. Fischeri*, G. Don). An ornamental, deciduous perennial, two feet high, from Siberia in 1819: root-leaves heart-shaped, other leaves lance-shaped, line-like; flowers, in July and September, pale blue; propagated by division in common soil. *Campanula Fischeri*, Ruiz.

6. Intermediate Gland Bell-flower (*A. intermedia*, Swartz). An ornamental, deciduous perennial, one foot and a half high, from Siberia in 1819: flowers, from July till September, pale blue; propagated by division in peaty loam.

7. Lamarck's Gland Bell-flower (*A. Lamarkiana*, Fischer). An ornamental, deciduous perennial, one foot and a half high, from Siberia in 1824: flowers, from June till August, pale blue; propagated by division in peaty loam.

8. Lily-leaved Gland Bell-flower (*A. liliifolia*, G. Don). An ornamental, deciduous perennial, two feet high, from Siberia in 1784: leaves lance-shaped; stem-leaves acutely saw-toothed; flowers, from May till September, pale blue, panicled, nodding; propagated by division in peaty loam.—Bot. Reg., 236.

9. Crowned Gland Bell-flower (*A. marsupiiflora*, Fischer). An ornamental, deciduous perennial, one foot and a half high: stem erect; leaves alternate, opposite, and in threes, line-like, lance-shaped, toothed; flowers, in June and July; panicle pyramidal, nodding, globular, abrupt; style very long; propagated by division of the root in common soil. *Campanula coronata*, Curtis.—Bot. Reg, 149.

10. Broad-leaved Gland Bell-flower (*A. pereskiæfolia*, Fischer). An ornamental, deciduous perennial, one foot and a half high, from Siberia in 1821: leaves egg-lance-shaped, coarsely toothed, rather whirled; flowers, from July till September, pale blue; propagated by division in peaty loam. *Campanula pereskiæfolia.*

11. Periplocian Gland Bell-flower (*A. periplocifolia*, Fischer). An ornamental, deciduous perennial, one foot high, from Siberia in 1824: leaves heart-egg-shaped, saw-toothed, smooth on both sides; leaf-stalks long; flowers, from July till September, pale blue; propagated by division in peaty loam. *Campanula periplocifolia*, Lamarck.

12. Rabelaisian Gland Bell-flower (*A. Rabelaisiana*, G. Don). An ornamental, deciduous perennial, one foot and a half high, from Siberia in 1823: flowers, from June till August, blue; propagated by division in peaty loam.

13. Long-styled Gland Bell-flower (*A. stylosa*, Fischer). An ornamental, deciduous perennial, one foot and a half high, from Siberia in 1820: leaves on footstalks, somewhat heart-shaped, sharply saw-toothed; flowers, in May and June, pale blue, small, nodding; propagated by division of the root in common soil. *Campanula stylosa*, Lamarck.—Gmel. Sib., III., 27.

13. Whirled Gland Bell-flower (*A. verticillata*, Fischer). An ornamental, deciduous perennial, two feet high, from Siberia in 1821: leaves lance-shaped, toothed, stalkless, whirled; flowers, in June, light blue, whirled; propagated by division in sandy loam. *Campanula verticillata*, Willdenow.—Pal. It., III., G. 1. [G. L.]

ADENOPHYLLUM, Persoon. The genus *Willdenovia* of Cavanilles.

ADENOSMA, R. Brown (from the Greek, *ἀδην*, "a gland," and *ὀσμη*, "odour"). Odour-gland. *Didynamia Angiospermia*, Linnæus; *Personatæ Orobancheæ*, Jussieu. Calyx five-parted, the upper segment the largest; corolla gaping; anthers approximating; stigma dilated; capsule beaked, two-parted.

1. Balsam Odour-gland (*A. balsamea*, Sprengel). An annual native of the East Indies: stem erect, smooth; leaves lance-shaped, saw-toothed, glutinous, stalked; flowers in whirls. *Ruellia balsamea*, Linnæus.

2. Myles-leaved Odour-gland (*A. chenopodifolia*, Sprengel). An East Indian plant: stem erect; leaves egg-oblong, entire, downy, stalked; flowers in whirls. *Ruellia chenopodifolia*, Poiret.

3. Blue-flowered Odour-gland (*A. cærulea*, R. Brown). A plant of New Holland: stem rather erect; leaves egg-oblong, downy; flowers in a kind of axillary spikes; flower-scales and calyx hairy.

4. Fragrant Odour-gland (*A. fragrans*, Sprengel). An native of the Society Islands: stem spreading; leaves rather round, notched, stalkless; flowers solitary, without flower-stalks. *Ruellia fragrans*, Forster.

5. Many-seeded Odour-gland (*A. polysperma*, Sprengel). An East Indian plant: stem spreading, slender; leaves oblong, blunt, rather entire, strigose; flowers in egg-shaped spikes. *Ruellia polysperma*, Roth.

6. Marshy Odour-gland (*A. uliginosa*, Sprengel). An annual of Coromandel: stem spreading, hairy; leaves egg-oblong, notched, downy, nearly stalkless. *Ruellia uliginosa*, Linnæus. [A. C.]

ADENOSTEMON, Persoon (from the Greek, *ἀδην*, "a gland," and *στημων*, "a stamen"). Filament Gland. *Decandria Monogynia*, Linnæus. Calyx of seven pieces; two glands at the base of the filaments; one stigma, divided; fruit two or three-celled.

1. Shining Filament-gland (*A. nitidum*, Persoon). A tree of Chili: leaves oblong, lance-shaped, shining; flowers white, axillary; fruit yellow, good flavoured. *Gomortega nitida*, Ruiz and Pavon; *Lucuma Keule* and *Keulia Chilensis*, Molin. [A. C.]

ADENOSTYLES, Cassini. The generic name under which Cassini has described some of the genus *Cacalia*. [A. C.]

ADENOTRICHIA, Lindley (from the Greek, *ἀδην*, "a gland," and *θριξ*, "hair"). Hair-gland. *Syngenesia Segregata*, Linnæus. *Compositæ Jacobeæ*, Jussieu. A new genus proposed by Lindley in the Botanical Register.

1. Embracing Hair-gland (*A. amplexicaulis*, Lindley). An ornamental, evergreen, greenhouse perennial, two feet high, from Chili in 1826: flowers, in May, yellow; propagated by seeds in common soil.—Bot. Reg., 1190. [G. L.]

ADEPS. In veterinary science, animal oil or fat. The fat differs in different animals; and hence it has received different names. In the horse it is called grease; in the ox and sheep, tallow, fat, suet; and in the hog, hog's lard. At a low temperature all these possess various degrees of consistence; but in the living animal they all exist in a fluid state, and are distributed over various parts of the body. An immense quantity of fat is often found in the belly, all deposited in extremely small cells, which have no communication with each other. No fat is ever found within the skull.

Fat performs some important functions in the animal economy. When the supply of aliment, for example, is greater than the demand, the surplus is stored away in the form of fat; and when the demand, either from deficiency of food, over-exertion, or disease, becomes greater than the supply, then the absorbents carry the fat into the circulation, and thus, for a time, the evils that would very soon arise from a defect in the quantity of blood, are prevented. Some animals accumulate fat more readily than others. Health, a round chest, a short back, and tranquil temper are highly favourable to its formation; and when, to these qualities, are added inaction, clean litter, and a plentiful supply of nourishing food, the animal is soon fit for the butcher. A warm atmosphere, provided it be a pure one, is also favourable to fattening, as will be detailed at length, with reference to each domestic animal in its proper place. [C. S.]

ADESMIA, De Candolle (from the Greek, α, "without," and δεσμος, "a bond"). Free Flower. *Monadelphia Decandria*, or *Decandria Monogynia*, Linnæus; *Leguminosæ*, Jussieu. Calyx five-parted, segments sharp pointed, somewhat equal; corolla papilionaceous, standard at first folded together above the other petals; keel with the tip curved and abrupt; stamens distinct, approaching; pod flattish, many jointed across; seeds flattish, kidney-shaped, and orbed; leaf-scales lance-shaped; leaves abruptly winged; flower-stalks axillary, one-flowered, and disposed in a terminal cluster by abortion of the upper leaves.

I.

ANNUALS: FLOWERS YELLOW, AXILLARY, SOLITARY, ON SHORT FLOWER-STALKS.

1. Narrow-leaved Free Flower (*A. angustifolia*, Hooker). A hardy plant from Valparaiso: stem lying on the ground, hairy, glandless; leaflets four or five pairs, distant, line-like, bluntish; flowers on one-flowered stalks; pod five or six-jointed; propagated by seeds in sandy loam.

2. Bristly Free Flower (*A. hispidula*, De Candolle). A stove plant from Peru: stem diffuse, somewhat rough with down; leaf-stalks and flower-stems bent back, and having a few prickles; leafits four to six yoked; leaflets oblong, blunt at the tip with the margin somewhat dotted, hairy; flower-stalks axillary, one-flowered, with the joints of the pod at the middle furnished with feathery bristles; propagated by seeds in sandy loam. *Hedysarum uniflorum*, Dombey; *Hedysarum pendulum*, *var* β, Poiret; *Æschinomene hispidula*, Lagasca.—D. C. Sp. 3.

3. Sword-pointed Free Flower (*A. muricata*, De Candolle). A greenhouse annual, one foot long, from Patagonia in 1793: stem lying down, glandular, rough; leafits five to seven-yoked; leaflets inversely egg-oblong, notched on the margin, rough; flowers in June and July; flower-stalks axillary, in a terminal cluster; joints of the pod sword-pointed; propagated by seeds in sandy loam. *Hedysarum muricatum*, Jacquin; *Hedysarum pimpinellæfolium*, Poiret; *Patagonium hedysaroides*, Schranck; *Æschinomene Patagonica*, Hort.—Jacq. Icon. T. 568.—D. C. Sp. 1.

4. Smith's Free Flower (*A. Smithiæ*, De Candolle). A stove annual from South America: stem lying down, downy; leafits five-yoked; leaflets wedge-shaped, notched, downy; flower-stalks axillary, one-flowered, shorter than the leaves; joints of the pod, hairy, rough; propagated by seeds in sandy loam.—D. C. Sp. 2.

5. Tender Free Flower (*A. tenella*, Hooker). A hardy annual from Chili: stem lying on the ground, hairy, glandless; leaflets three or four pairs, inversely egg-oblong, blunt or abruptly blunt; flowers on axillary, one-flowered stalks; pod two or three-jointed; propagated by seeds in sandy loam.

II.

PERENNIALS WITH VERY LONG TERMINAL LEAFLETS: FLOWERS YELLOW, IN CLUSTERS, OR PANICLES.

6. Two-coloured Free Flower (*A. bicolor*, De Candolle). A stove perennial, from Monte Video; stem prostrate; leaflets nine to twelve pairs, lance-shaped, pointed, entire, downy; leaf-scales (*stipulæ*) similar to the leaflets; flowers large, red without, yellow within; clusters very long, opposite to the leaves; joints of the pods six to eight, in front somewhat round, very short, downy; propagated by seeds or by cuttings in sandy loam and peat. *Hedysarum bicolorum*, Poiret.

7. Crowded Free Flower (*A. conferta*, Hooker). A greenhouse perennial, from Chili: plant ascending, downy; leaflets six pairs, inversely-egg-oblong, abruptly blunt; flowers crowded; pod three or four jointed, glandular; propagated by seeds in sandy loam.

8. Toothed Free Flower (*A. dentata*, De Candolle). A stove perennial, one to two feet high, from South America: stem erect, glandular, downy; leaflets four or five pairs, inversely egg-oblong, abrupt, above cut, saw-toothed, at first somewhat velvety; joints of the pod four to eight, dotted, sword-pointed; propagated by seeds or cuttings in sandy loam and peat. *Æschinomene dentata*, Lagasca.

9. Fruticulose Free Flower (*A. fruticulosa*, G. Don). A stove perennial from Mexico: stem lying on the ground, hairy; leaflets in numerous pairs, small, lance-shaped, sharp-pointed; flowers on few-flowered stalks; pod three or four jointed, hairy, covered with sharp points; propagated by seeds or cuttings in sandy peat and loam. *Æschinomene fruticulosa*, Herb. Lamb.

10. Long-bristled Free Flower (*A. longiseta*, De Candolle). A stove perennial, from South America: stem lying down; leaflets six to seven pairs, inversely egg-oblong, sword-pointed; clusters somewhat terminal; flowers very distant, foot-stalked; calyx glandular, bristles of the pod very long and rigid; propagated by seeds in sandy loam.

11. Mimosan Free Flower (*A. mimosoides*, G. Don). A stove perennial, from Mexico: stem lying on the ground; leaflets in numerous pairs, alternate, line-like, blunt, stiff-pointed, stalkless; flower-stalks one flowered; propagated by seeds or cuttings in sandy peat and loam. *Æschinomene mimosoides*.—Herb. Lamb.

12. Downy-podded Free Flower (*A. papposa*, De Candolle). A greenhouse perennial, one foot high, from Chili in 1823: stem descending at the base, leafy and velvety; leaflets eight to ten pairs, oval, lance-shaped, sword-pointed, entire, beneath at first downy; flowers, in June and July, yellow; clusters very long, foot-stalked, many-flowered; calyx without glands; bristles of the pod feathery and soft; propagated by seeds in sandy loam. *Æschinomene papposa*, Lagasca; *Hedysarum papposum*, L'Heritier.

13. Drooping Free Flower (*A. pendula*, De Candolle). A stove perennial, one foot high, from Buenos Ayres in 1825: stems diffuse, somewhat clustering, scarcely downy; leaflets seven to nine pairs, oval, oblong, entire, downy; flowers in June and July, yellow, in longish clusters, lower flowers distant; joints of the pod seven to eight; pod drooping, rough; propagated by seeds in sandy loam. *Hedysarum pendulum*, *Var.* α, Poiret.

14. Dotted Free Flower (*A. punctata*, De Candolle). A stove perennial, from Buenos Ayres: stem lying down, hairy, glandular; leaflets nine to twelve pairs, line-like, blunt, entire, somewhat sword-pointed, downy, fringed; the pod oblong, black dotted, jointed; flowers purplish on the outside: propagated by seeds or cuttings in sandy peat and loam. *Hedysarum punctatum*, Poiret.

III.

STEMS SHRUBBY, AND FURNISHED WITH THORNS.

15. Glutinous Free Flower (*A. glutinosa*, Hooker). A greenhouse shrub, two feet high, from Chili in 1831: branches beset with glandular, glutinous hairs; leaflets, about three pairs, oval, hairy; flowers yellow: pod three-jointed, very long, covered with feathery bristles; propagated by seeds in sandy loam.

16. Small-leaved Free Flower (*A. microphylla*, Hooker). A greenhouse shrub, two feet high, from Valparaiso in 1826: leaflets, six pairs, small, roundish, downy, on short stalks; flowers, during the summer months, yellow; pod three-jointed, covered with long feathery bristles; propagated by seeds or cuttings in sandy peat and loam.—Bot. Cab. 1691.

IV.

STEMS SHRUBBY, BUT NOT FURNISHED WITH THORNS.

17. Balsam-bearing Free Flower (*A. balsamifera*, Hooker). A beautiful greenhouse shrub, from Chili: plant thickly covered with resinous glands; leaflets about ten pairs, wedge-oblong, and generally one terminal; pod six-jointed; propagated by seed or by cuttings in sandy peat and loam. *Mimosa balsamica*, Feuillee.

18. Many-blossomed Free Flower (*A. floribunda*, G. Don). An elegant greenhouse shrub, two to four feet high, from Mexico: stem erect; branches downy; leaflets in many pairs, lance-shaped, oblong, stiff-pointed, hairy; flowers on axillary few-flowered stalks, forming a kind of cluster at the tops of the branches. [G. L.]

ADGLUTINATE (in Latin, *Adglutinatus*). Glued together.

ADHERENT (in Latin, *Adhærens*). Adhering or attached by the side to the surface.

ADIANTUM, Linnæus (from the Greek, '*αδιαντος*, "dry"). Maiden-hair. *Cryptogamia Filices*, Linnæus; *Polypodaceæ*, R. Brown. The capsule groups (*sori*) line-like, contiguous, or in oval spots at the end of the leaves, or at the bent back tip of the leaf underneath; the envelope (*indusium*) opening inwards, either nearly continuous, or scaly or kidney-shaped.

1. A. Capillus Veneris, 12. 2. A. macrophyllum, 3. 3. A. radiatum, 10. 4. A. reniforme, 1. 5. A. serrulatum, 5. 6. A. tenerum, 20.

I.

LEAVES (*fronds*) SIMPLE.

1. Kidney-leaved Maiden-hair (*A. reniforme*, Linnæus). An evergreen, greenhouse perennial, nine inches high, from Madeira in 1699: leaves kidney-shaped, on foot-stalks; many-fruited; propagated by dividing the roots in sandy peat.—Bot. Cat. 841.

II.

LEAVES (*fronds*) SIMPLY WINGED.

2. Lunated Maiden-hair (*A. lunatum*, Cavanilles). An ornamental, evergreen, bark-stove perennial, six inches high, from Mexico in 1823: fruiting in July; propagated by division in loamy peat.

3. Large-leaved Maiden-hair (*A. macrophyllum*, Swartz). An evergreen, bark-stove perennial, one foot high, from Jamaica in 1793: leaves winged; leafits commonly from one to two inches in length, and about one inch and a quarter in breadth; stalk seldom branched or divided; fruiting in July and August; fructifications continued in front and below; propagated by division in peaty loam.—Brown, Jam. 38, 1.

III.

LEAVES (*fronds*) COMPOUND.

4. Deltoid Maiden-hair (*A. deltoideum*, Swartz). An ornamental, evergreen, bark-stove perennial, one foot high, from Jamaica in 1824: leaf winged; leafits alternate, triangular, blunt; fruiting in July and August; fructifications continued above and in front; propagated by division in peaty loam.

5. Saw-toothed Maiden-hair (*A. serrulatum*, Humboldt). An ornamental, evergreen, bark-stove perennial, one foot high, from Jamaica in 1822: leaf doubly winged; leafits triangular-oblong, saw-toothed; foot-stalk black and shining; fruiting in August; fructifications solitary, superior, jagged on the edges; propagated by division in peaty loam.—Pluk. Al. 125, 2.

6. Various Maiden-hair (*A. varium*, Humboldt). An ornamental, evergreen, bark-stove perennial, one foot high, from South America in 1820: fruiting in July and August; propagated by division in peaty loam.

IV.

LEAVES (*fronds*) TREBLY PARTED; BRANCHES WINGED.

7. Hairyish Maiden-hair (*A. hispidulum*, R. Brown). An ornamental, evergreen, greenhouse perennial, one foot high, from New Holland in 1822: fruiting from May till August; propagated by division in peaty loam.

8. Spreading Maiden-hair (*A. patens*, Willdenow). An ornamental, evergreen, bark-stove perennial, one foot high, from Brazil in 1824: fruiting in August and September; propagated by division in sandy peat.

9. Stalked Maiden-hair (*A. pedatum*, Linnæus). An elegant, deciduous perennial, one foot and a half high, from North America in 1640: leaves resembling the comb of a cock; leafits wing-cleft; segments gashed; fruit-bearing; stalk (*rachis*) dark purple; root small; fruiting in August and September; propagated by division of the root in sandy peat.—Schk. Filic. 115.

10. Rayed Maiden-hair (*A. radiatum*, Linnæus). An evergreen, greenhouse perennial, nine inches high, from the West Indies in 1766: leaf fingered; leafits wing-cleft. This elegant little plant rises by a simple stalk, and then divides into five or more simple branches, disposed in a radiated, expanding form; fruiting from April till August; propagated by division in peaty loam.—Pl. Fil. 100.

11. Trefoil Maiden-hair (*A. ternatum*, Humboldt). An ornamental, evergreen, bark-stove perennial, nine inches high, from South America in 1819: fruiting in July; propagated by division in peaty loam.

V.

LEAVES (*fronds*) DOUBLY WINGED.

12. Venus's Maiden-hair (*A. Capillus Veneris*, Linnæus). An elegant, evergreen, British perennial, nine inches high: leaves, branches, and leaf-stalks shining black; leafits at first roundish, afterwards wedge-shaped; stalks of the branches very large, sustaining three leaves, which are smooth, tender, toothed; fruiting from May till September; propagated by division of the root in sandy peat.—Eng. Bot. 1564.

13. Dusty Maiden-hair (*A. pulverulentum*, Linnæus). An elegant, evergreen, bark-stove perennial, one foot and a half high, from the West Indies in 1793: leaves doubly winged; leafits oval, abrupt; stalk (*rachis*) shaggy; fruiting from June to September; propagated by division in sandy peat.—Schk. Fil. 119.

14. Rhomboid Maiden-hair (*A. rhomboideum*, Kunth). An ornamental, evergreen, bark-stove perennial, one foot high, from South America in 1820: fruiting from June till September; propagated by division in peaty loam.

15. Streaked Maiden-hair (*A. striatum*, Swartz). An evergreen perennial, from Jamaica: leaf doubly winged; segments four-cornered, pyramidal, erect; leafits alternate, polished, entire; fructifications superior and continued.

16. Hairy Maiden-hair (*A. villosa*, Linnæus). An ornamental, evergreen, bark-stove perennial, one foot high, from Jamaica in 1775: stem black, strong, triangular, covered with a hairy, rusty, mossy substance; the leaves begin about a foot from the ground; leafits alternate; fruiting from June till September; propagated by division in sandy peat.—Schk. Fil. 120.

VI.

LEAVES (*fronds*) SUPRA DECOMPOUND.

17. Assimilated Maiden-hair (*A. assimile*, Swartz). An ornamental, evergreen, greenhouse perennial, one foot high, from New Holland in 1823: fruiting from May till August; propagated by division in peaty loam.—Labil. Nov. H. II. 248, 2.

18. Wedge Maiden-hair (*A. cuneatum*, Hooker). An ornamental, evergreen, greenhouse perennial, one foot high, from Brazil in 1820: fruiting in August: propagated by division in peaty loam.—Hooker and Grev. F. 30.

19. Pretty Maiden-hair (*A. formosum*, R. Brown). An ornamental, evergreen, greenhouse perennial, one foot high, from New Holland in 1820: fruiting from May till August; propagated by division in peaty loam.

20. Slender Maiden-hair (*A. tenerum*, Swartz). An ornamental, evergreen, bark-stove perennial, one foot high, from Jamaica in 1793: leafits rhomboid, blunt, cut, lobed on the upper edge; stalk black and shining; fruiting in July; fructifications interrupted; propagated by division in sandy peat.—Pluk. Al. 354, 1.

21. Rhomb-leaved Maiden-hair (*A. trapeziforme*, Linnæus). An elegant, evergreen, bark-stove perennial, one foot and a half high, from the West Indies in 1793: leafits trapezoid, tapering to a point, cut, nicked towards the end of the upper edge; capsule groups (*sori*) on the notches; fruiting in June and July; propagated by division of the root in sandy peat.—Schk. Fil. 112. [G. L.]

ADINA, Salisbury (from the Greek, ἀδινός, "clustered"). Cluster Blossom. *Tetrandria Monogynia*, Linnæus; *Rubiaceæ*, Jussieu. Calyx with the tube oblong, bell-shaped, and five-parted; corolla funnel-shaped, five-lobed, lobes valved; anthers without filaments, shut up at the bottom of the lobes; capsule membranaceous, two-celled; two to four seeds in each cell; flower-stems axillary, seldom terminal, solitary.

1. Globe Cluster Blossom (*A. globiflora*, Salisbury). An ornamental bark-stove shrub, three feet high, from China in 1804: leaves lance-shaped; flower-stems shorter than the leaf; flowers, in July and August, white; propagated by cuttings in sandy peat. *Nuclea Adina*, Smith.—Bot. Reg. 895; Bot. Mag. 2613; Bot. Cab. 1284.

2. Stalked Cluster Blossom (*A. pedunculatis*, De Candolle). A shrub found in China: leaves inversely-egg-oblong, lance-shaped; flower-stems doubly longer than the leaf. *Nauclea adinoides*. [A. C.]

ADLUMIA, Rafinesque (named from the American botanist, Adlum). Sponge Flower. *Diadelphia Hexandria*, Linnæus; *Fumariaceæ*, Jussieu. Petals united in a spongy, one-petaled corolla, and with two protuberances at the base; pod two-valved, and many-seeded.

1. Tendrilled Sponge Flower (*A. cirrhosa*, Rafinesque). An ornamental climbing biennial. fifteen feet high, from North America in 1788: flowers, from June till September, whitish-purple; propagated by seeds in sandy loam. *Corydalis fungosa*, Ventenat; *Fumaria fungosa*, Aiton; *Bicuculla fumarioides*, Börckhausen; *Capnoides scandens*, Mœnch; *Fumaria recta*, Michaux. [A. C.]

ADNASCENS, ADNASCENTIA (from the Latin, *ad*, "to," and *nascens*, "bearing"). The cloves, or small bulbs growing at the base of the main bulb, or the shoots of the pine-apple.

ADNATE (in Latin, *Adnatus*). Adhering, as when anthers are attached through their whole length to the filaments. The small bulbs at the base of the main bulbs in the tulip and hyacinth are termed cloves (in Latin, *adnata*). [B. E.]

ADONIS, Linnæus (named from the Adonis of mythology). Pheasant's Eye. *Polyandria Polygynia*, Linnæus; *Ranunculaceæ*, Jussieu. Calyx with five leaves, somewhat separated at the base; petals five to fifteen, with the claw naked; stamens indefinite in number, inserted at the bottom of the receptacle; seed-organs many, aggregated in an egg-oblong or cylindrical spike, one-seeded, terminated by a straight, conical style.

I.

SEEDS WITH A STRAIGHT, HOOKED, TAPER-POINTED STYLE; PETALS FIVE TO TEN; ROOTS ANNUAL. ADONIA, *De Candolle*.

1. Summer Pheasant's Eye (*A. æstivalis*, Linnæus). A pretty annual, one foot and a half high, from the South of Europe in 1629: calyx bristly at the base; petals flattish, oblong, blunt, doubly longer than the calyx; fruit netted, disposed in an oblong, lax spike; stem somewhat simple; flowers, in June and July, scarlet; propagated by seeds in common soil. *A. maculata*, Wallroth; *A. miniata*, Jacquin.—Jacq. Fl. Aust. T. 354.

2. Anomalous Pheasant's Eye (*A. anomala*, Wallroth). A hardy ornamental annual, one foot high, found in fields about Halle: calyx outwardly hairy, rather sharp-pointed; petals three, oblong, flat, rather blunt, spreading; stem branching; flowers in June and July.

3. Autumnal Pheasant's Eye (*A. autumnalis*, Linnæus). A pretty British annual, one foot and a half high; calyx smooth, purplish; petals six to eight, concave, a little longer than the calyx; fruit netted, in an egg-oblong head; stem branching; flowers, from May till October, crimson; propagated by seeds, sown in autumn or spring, in common soil.—Eng. Bot. 308.

4. Citrine Pheasant's Eye (*A. citrina*, Hoffmann). An ornamental annual, one foot high, from the South of Europe in 1819: calyx bristly at the base; petals flattish, oblong, longer than the calyx; fruit in an egg-oblong head; stem somewhat simple; flowers, in June and July, orange, small, somewhat sitting among the leaves; propagated by seeds in common soil.

5. Toothed Pheasant's Eye (*A. dentata*, De Candolle). A hardy ornamental annual, one foot high, from Egypt. calyx bristly at the base; petals flat, oval, oblong, a little longer than the calyx; fruit at the base tubercled, toothed, netted, in a continued longish spike.—Desc. Eg. Tab. 53, f. 1.

6. Yellow Pheasant's Eye (*A. flava*, Villars). A pretty annual, one foot high, from the south of Europe; calyx smooth at the base, separate; petals flattish, oblong, doubly longer than the calyx; fruit somewhat smooth, aggregated in an oblong head; stem somewhat simple; flowers, in June and July, yellow; propagated by seeds in common soil.—Wein. 28, a. b.

7. Flame Pheasant's Eye (*A. flammea*, Murray). A hardy ornamental annual, one foot high, from Austria in 1800: calyx bristly at the base; petals flattish, oblong, longer than the calyx; fruit in a cylindrical head; stem branching; flowers, in June and July, yellow, large, on foot-stalks; propagated by seeds in common soil.—Jacq. Fl. Aust. IV. T. 355.

8. Minute-flowered Pheasant's Eye (*A. micrantha*, De Candolle). A hardy ornamental annual, one foot high, from the corn fields in the south of France: calyx smooth, not separated at the base; petals smooth, oblong, a little longer than the calyx; fruit somewhat netted; aggregated in a somewhat egg-oblong head; stems somewhat branched; flowers minute, yellow, or flame-coloured.

9. Small-fruited Pheasant's Eye (*A. microcarpa*, De Candolle). An ornamental annual, one foot high, from Spain in 1824: calyx smooth; petals with a flat, smooth surface, oblong, doubly longer than the calyx; fruit netted in an oblong head; stem somewhat simple; flowers in June and July, flesh coloured; propagated by seeds in common soil.

10. Small-flowered Pheasant's Eye (*A. parviflora*, Fischer). A hardy ornamental annual, one foot high, from Russia: calyx separated at the base, smooth; petals with a smooth, flat surface, oblong, the length of the calyx; fruit in an egg-oblong head; stem simple; flowers, in June and July, pale scarlet.

II.

SEEDS WITH A CURVED, HOOKED STYLE; PETALS EIGHT TO FIFTEEN; ROOTS PERENNIAL. CONSOLIGO, *De Candolle*.

11. Dahurian Pheasant's Eye (*A. Dahurica*, Reichenbach). An ornamental, hardy, deciduous perennial, two feet high, from Siberia in 1827: leaves three-cut, line-like; flowers, in April and May, yellow; propagated by division in common soil.—Reich. Icon. 321.

12. Distorted Pheasant's Eye (*A. distorta*, Tenore). An ornamental, hardy, deciduous perennial, one foot high, from Naples in 1827: flowers, in April and May, yellow; propagated by division in common soil.—Flor. Med. 448. 1.

13. Irkoutsk Pheasant's Eye (*A. Ircutiana*, Fischer). A hardy perennial, one foot high, found around Irkoutsk: leaves of the stem and at the summit without foot-stalks, many-cut, lobes toothed; calyx smooth; petals egg-oblong.

14. Pyrenean Pheasant's Eye (*A. Pyrenaica*, De Candolle). An ornamental perennial, fifteen inches high, from the Pyrenees in 1817: radical leaves on leaf-stalks, which are three-parted; segments many-cleft; flowers, in July, yellow; petals eight to ten, oblong, wedge-shaped, entire; summits of the pistils without styles, many-cleft; lobes line-like, entire; fruit smooth; propagated by division in common soil.—Deless. I. 21.

15. Siberian Pheasant's Eye (*A. Sibirica*, Patrin). An ornamental, hardy, deciduous perennial, two feet high, from Siberia in 1827: flowers, in April and May, yellow; propagated by division in common soil.

16. Spring Pheasant's Eye (*A. vernalis*, Linnæus). An ornamental perennial, one foot high, from the south of Europe in 1629: the lower radical leaves in the form of somewhat sheathing scales; leaves on the middle and at the top of the stem, without foot-stalks, many-cleft; lobes very entire; fruit velvety; flowers, in March and April, yellow; petals ten to twelve, oblong, somewhat toothed; propagated by division in sandy peat.—Bot. Mag., 134.

17. Volga Pheasant's Eye (*A. Volgensis*, Stevens). An ornamental perennial, from the Volga in 1818: lower radical leaves in the form of somewhat sheathing scales; leaves on the middle and at the top of the stem without foot-stalks, many-parted; lobes toothed at the edge; flowers, in April and May, yellow; calyx downy outside; petals ten to twelve, oblong; fruit somewhat velvety; propagated by division in sandy peat. *A. Apennina?* Pallas; *A. chærophylla*, Fischer.—Deless. I. 20. [G. L.]

ADOXA, Linnæus (from the Greek, α, "without," and δόξα, "glory"). Gloryless. *Octandria Tetragynia*,

Linnæus; *Araliaceæ*, Jussieu. Tube of the calyx adhering; lobes four to five, oval; stamens eight to ten, some alternating and others opposite to the leaves of the calyx; berry four-celled; seeds four, girt round with a membrane; radical leaves on foot-stalks, which are three-parted; segments three-cleft, bluntly lobed; flowers, without foot-stalks, becoming green.

1. Musk Gloryless (*A. moschatellina*, Linnæus). A British perennial, four inches high: flowers, from March till May, greenish-yellow, terminal one five-parted, side ones four-parted; smelling of musk in the dew; propagated by seeds or by division in sandy peat. *Moschatellina tetragonia*, Mœnch.—Eng. Bot. 453. [G. L.]

ADRASTEA, De Candolle (Adraste, a fury in mythology). Adraste's Flower. *Decandria Digynia*, Linnæus; *Dilleniaceæ*, Jussieu. Calyx of five, taper-pointed, persistent leaves; petals five, oval, falling off; stamens free, equal; filaments flat; seed-organs two; styles straight.

1. Willow-leaved Adraste's Flower (*A. salicifolia*, De Candolle). A pretty little greenhouse shrub, two feet high, from marshes about Botany Bay: leaves line-like; flowers yellow; propagated by cuttings in loamy peat. [A. C.]

ADRIANA, Gaudich. Adrian's Flower. *Diœcia Polyandria*, Linnæus; *Euphorbiaceæ*, Jussieu. Male flower; calyx simple, five-parted, furnished with flower-scales; no corolla. Female flower; calyx twice five-parted; capsule three-seeded.

1. Smooth-leaved Adrian's Flower (*A. glabrata*, Gaudich). Leaves egg-oblong, entire, three-lobed, smooth above, hairy beneath. New Holland.

2. Cottony Adrian's Flower (*A. tomentosa*, Gaudich). Leaves three to five-lobed, hairy on both sides. New Holland. [A. C.]

ADULT (in Latin, *Adultus*). Full-grown; past the age of juvenility. It is chiefly applied to animals; rarely to plants.

ADYSETON, or ADYSETUM. A division of the genus *Alyssum*.

ÆCHMEA, Ruiz and Pavon. Threes. *Hexandria Monogynia*, Linnæus; *Bromeliaceæ*, Jussieu. Calyx doubly three-parted; corolla three-petalled; stigma three-lobed; capsule three-celled, three-valved.

1. Panicled Threes (*Æ. paniculata*, Ruiz and Pavon). A parasitical plant, native of Peru: leaves sword-shaped, prickly; flowers in panicles.—Spreng. Syst. Veg. II. 22. [A. C.]

ÆCIDIUM, Persoon (from the Greek, αἰκίον, "a wheal," and ὠδες, "like"). Wheal-rust. *Cryptogamia Fungi*, Linnæus; *Coniomycetes Hypodermi*, Fries. The envelope (*pseudo-sporidium*) is formed by the outer bark of the plants or leaves, which is cup-shaped or tubular, short, opening regularly at the tip, and forming a low rim; the spore-cases (*sporidia*) are contained within this, and are free, globular, and one-celled.

While Link makes six divisions of the genus, Fries and Adolphe Brongniart seem disposed to think there is but little certainty among the species; an opinion which ought not, we think, to be adopted without much stronger reasons than the vague ones they assign.

1. Æ. Pinii, 33. 2. Æ. Berberidis, 24. 3. Æ. cornutum, 26. 4. Æ. Grossulariæ, 28. 5. Æ. laceratum, 30. 6. Æ. Thalictri 39.

I.

SPORE-TUBES (*thecæ*) IRREGULARLY CROWDED TOGETHER.

1. Winter-cress Wheal-rust (*Æ. Barbareæ*, De Candolle). The spore-tubes crowded, orb-like; mouths whitish, notched; spore cases orange-yellow; spots collected into rather circular clusters, with a thickened, red, base; envelope cylindrical, longish, with a circular opening, disk orange; tufts girt with a brownish margin. On the leaves of *Barbarea vulgaris*, R. Brown.

2. Earth-nut Wheal-rust (*Æ. Bunii*, De Candolle). Tufts egg-oblong, or orbicular, raised, irregular; spore-tubes numerous, rather distinct, yellow and orange; mouths scarcely

cut; capsules (*peridia*) somewhat round, prominent, and yellowish. On the leaves of the earth-nut.

3. Crowded Wheal-rust (*Æ. confertum*, De Candolle). Tufts clustered, with a whitish edge; spore-tubes crowded, running into each other, white, with a circular toothed opening; spore-cases yellow, becoming brown. On the lower surface of the leaves of *Ranunculi* and *Ficaria*.

4. Cornel Wheal-rust (*Æ. Corni*, Sowerby). Tufts crowded, base orange; spore-tubes yellowish-orange; mouth not cut(?). On the lower face of the leaves of the wild cornel-tree.

5. Thick Wheal-rust (*Æ. crassum*, Persoon). Tufts irregularly crowded, thick, convex; spore-tubes pitcher-shaped, orange; spore-cases pale-yellow. On the berry-bearing alder.

6. Irregular Wheal-rust (*Æ. irregulare*, De Candolle). Tufts brownish, thickish; capsule (*peridium*) pale-yellow, at first cylindrical and blunt, then disappearing. Found on the lower leaves of buckthorn.

7. Butter-Burr Wheal-rust (*Æ. Petasitidis*, Sowerby). Spore-tubes bell-shaped, light brown; mouths cracked, turned back; spore-cases yellowish. On the lower face of the leaves of butter-burr.

8. Crowfoot Wheal-rust (*Æ. Ranunculi*, De Candolle). Tufts few, capsuled; spore-tubes crowded, pale, prominent; mouths torn, edges turned back. On the lower face of the leaves of *Ranunculus acris*, and *R. bulbosus*.

9. Nettle Wheal-rust (*Æ. Urticæ*, De Candolle). Spots clustered, on a much thickened base: capsules bell-shaped, in a mass, rarely single, split into many short, bent back, teeth; spore-cases ochre-yellow, numerous, egg-oblong. On the leaves and stems of the common stinging-nettle, distorting them much.

II.

SPORE-TUBES (*thecæ*) IN CONCENTRIC CIRCLES.

10. Borage Wheal-rust (*Æ. Asperifoliarum*, De Candolle). Spore-tubes white, confluent: wine-glass-shaped, half immersed, pale yellow; spore-cases yellowish-white. On the lower face of the leaves of various *Boragineæ*.

11. Virgin's Bower Wheal-rust (*Æ. Clematitis*, De Candolle). Spore-tubes pale-yellow; mouths slightly toothed, at length vanishing; spore-cases yellow. On the lower surface of the leaves of Traveller's-joy.

12. Reddish Wheal-rust (*Æ. rubellum*, Sowerby). Spore-tubes very small, confluent, partly immersed, splitting regularly into small rolled back white teeth; spore-cases yellowish-white. On the lower surface of the great water-dock leaves, which are thereby spotted red on the upper surface.

Var. b. Sparse Wheal-rust (*Æ. sparsum*). Sowerby, Tab. 405.

13. Tussilago Wheal-rust (*Æ. Tussilaginis*, De Candolle). Spore-tubes immersed, confluent, very short, white, edge-toothed; spots collected into round thickened clusters, and arranged somewhat circularly; disk reddish-orange. On the under surface of leaves of colts-foot, which are thereby spotted with purple on the upper surface, very common, from spring to autumn.

III.

SPORE-TUBES (*thecæ*) DISTINCT.

14. Stone-wort Wheal-rust (*Æ. Characiæ*, De Candolle). Spore-tubes remote; mouths scarcely cut, turned back; spore-cases orange coloured. Found on the under surface of the leaves of *Characias amygdaloides*, rarely on the upper.

15. Chicory Wheal-rust (*Æ. Cichoracearum*, De Candolle). Spore-tubes scattered, distinct, hemispherical, white; mouths unequally torn, the cover circular or oval; lobes few, turned back, broad; disk orange coloured. On chicory.

Var. b. Goat's Beard Wheal-rust (*Æ. Tragopogi*, Persoon, Syn., 211.

16. Willow-herb Wheal-rust (*Æ. Epilobii*, De Candolle). Spore-tubes scattered, distinct, numerous, white; margin of the cover raised, with the teeth turned back; disk orange coloured, becoming brownish. On the under side of the leaves of square-stalked willow herb, rarely on the upper.

17. White Spored Wheal-rust (*Æ. leucospermum*, De Candolle). Spore-tubes cylindrical. prominent, whitish; mouths thick, mostly toothed; spore-cases very copious and white. On the under surface of the leaves of the wood anemone.

Var. b. Entire Wheal-rust (*Æ. integrum*). Mouths not cut.

18. Honeysuckle Wheal-rust (*Æ. Periclymeni*, De Candolle). Spore-tubes numerous, at first nearly globular, then rather conical; cover prominent, whitish, with a toothed orifice; disk fine orange, or dark red. On the leaves of the honeysuckle, generally on the under surface, but sometimes on the upper also.

19. Dotted Wheal-rust (*Æ. punctatum*, Persoon). Spore-tubes hemispherical, pale yellow; mouths not cut; spore-cases brown. On the under side of the leaves of yellow anemone.

20. Bramble Wheal-rust (*Æ. Rubi*, De Candolle). Spore-tubes flattish, edge white; mouth orbicular, prominent, not cut, or but slightly toothed; spore-cases yellowish-brown. On the under surface of bramble leaves.

21. Violet Wheal-rust (*Æ. Violarum*, De Candolle). Spore-tubes many, close together, rather prominent, whitish; margin of the cover whitish, raised, with everted blunt teeth; disk orange-yellow, becoming orange-brown. On the leaves of the dog violet, in circular patches, and in a diffused manner on the foot-stalks.

22. Whitish Wheal-rust (*Æ. albescens*, Greville). Capsules (*peridia*) very white, split into a few comparatively large teeth; spore-cases yellowish-white. On the leaves and stalks of *Adoxa moschatellina*.

23. Garlic Wheal-rust (*Æ. Allii*, Greville). Spots arranged in concentric circles on a pale spot of the leaf upon which they grow, not thickened, small, splitting into small, brittle, yellowish-white teeth; spore-cases pale. On both surfaces of *Allium ursinum*.

24. Barberry Wheal-rust (*Æ. Berberidis*, Greville). Spots collected into rather circular clusters, with a thickened red base, with seed-vessel, calyx, and even petals; cover short or longish, cylindrical, densely crowded, fine orange; spore-cases yellow under the microscope. Frequents the leaves of the barberry.

25. Marsh Marigold Wheal-rust (*Æ. Calthæ*, Greville). Spots aggregated, short, somewhat bell-shaped, with numerous very minute marginal teeth; spore-cases bright orange, rather round or oval. On the under side of the leaves of *Caltha palustris*.

26. Horned Wheal-rust (*Æ. cornutum*, Greville). Tufts clustered on an orange-coloured thickened spot, the spore-cases forming long, curved, cylindrical tubes of a pale brown. On the under surface of the leaves of the mountain-ash, in Autumn, after appearing as one thickened brown spot.

27. Crane's-bill Wheal-rust (*Æ. Geranii*, De Candolle). Tufts irregularly clustered on a thickened base, orange-yellow, hemispherical, with a somewhat toothed margin formed by the swollen and ruptured envelope; spores minute, globular. On the ribs of the leaves of *Geranium pratense*, but rare.

28. Gooseberry Wheal-rust (*Æ. Grossulariæ*, Greville). Spots clustered on a much thickened base; capsules densely

crowded, splitting into yellowish-white teeth; spore-cases pale orange. Frequently on the leaves and young fruit of the gooseberry.

29. Ragwort Wheal-rust (*Æ. Jacobææ*, Greville). Capsules splitting into short, brittle, yellowish-white teeth; spore-cases pale orange. On the under side of the leaves of *Senecio jacobæa*.

30. Hawthorn Wheal-rust (*Æ. laceratum*, Greville). Tufts densely aggregated; capsules longish, agglomerated. brown, splitting to the base into hair-like segments; spore-cases numerous, light brown. On the leaf-ribs, leaf, stalks, and fruit of the hawthorn.

31. Pea Wheal-rust (*Æ. Leguminosarum*, Greville). Spots scattered, colour whitish. On the leaves of *Leguminosæ*.

32. Mint Wheal-rust (*Æ. Menthæ*, De Candolle). Tufts deformed; orange yellow. On the stalks and leaves of mint.

33. Pine Wheal-rust (*Æ. Pini*, Greville). Tufts large oblong, or conical, much scattered, pale orange, bursting with an irregular orifice; spore-cases very abundant, bright orange. On *Pinus sylvestris*.

34. Hawk-weed Wheal-rust (*Æ. Prenanthis*, Greville). Spots in circular or irregular patches, on a very slightly thickened base, surrounded with a purplish halo; capsule with a very short footstalk, split very white, exceedingly brittle teeth; spore-cases pale yellow. On the leaves of hawkweed (*Hieracium paludosum*).

35. Primrose Wheal-rust (*Æ. Primulæ*, De Candolle). Spots scattered; pale yellow. On the leaves of the primrose.

36. Buckthorn Wheal-rust (*Æ. Rhamni*, Persoon). Tufts clustered, reddish yellow. On the leaves of buckthorn.

37. Swine-thistle Wheal-rust (*Æ. Sonchi*, G. Johnston). Spots minute, scattered, whitish, or cream-coloured, prominent; capsule splitting rather irregularly; granules egg-oblong, rather large. On the under surface of the leaves of *Sonchus arvensis* in autumn.

38. Dandelion Wheal-rust (*Æ. Taraxaci*, Greville). Spots clustered on a slightly thickened base, scattered over the leaf to which they adhere; capsule white, splitting into rather turned back teeth; spore-cases fine orange. On the leaves of the dandelion, but not common.

39. Meadow Rue Wheal-rust (*Æ. Thalictri*, Greville). Spots somewhat clustered; clusters of a roundish form; capsule oblong-cylindrical, bright orange; mouth paler and bursting irregularly. On *Thalictrum alpinum*.

40. Valerian Wheal-rust (*Æ. Valerianearum*, Lamarck). Spots on a thickened, rather circular, or oblong base; capsule whitish, with a circular, cupped, somewhat torn mouth; dark orange red. On the under surface of the leaves, and on the foot-stalks of valerian; not uncommon. [G. L.]

ÆGAGROPILUS. In veterinary science, Hair-Balls, an inorganic concretion, chiefly composed of hair or wool, with some indigestible matter, and found in the alimentary canal of quadrupeds, especially the ox, sheep, and goat. When the hair-balls occur in the horse, they are found in some part of the large intestines; but in animals which chew the cud they are found in the fourth stomach. The origin of these balls is to be traced to the hair or wool which the animal swallows in licking itself or its companion. Their shape and size vary considerably: they are rarely seen smaller than a walnut, and still more rarely larger than a cricket-ball. In general they are nearly spherical, often irregular, flattened, and egg-oblong. Most of them are covered with a smooth coat of hair, running evenly in one direction, so as to form spiral turns; but, upon cutting into them, the hair is seen lying confusedly in all directions. The hair-ball seldom produces any mischief to the animals in which it is found, as long as it remains in the stomach, or a large part of the intestine; but now and then balls find their way into some of the small intestines, and block up the passage, producing inflammation and death. [C. S.]

ÆGERITA, Persoon (from the Greek, αἴγειρος, "poplar"). Poplar Mould. *Cryptogamia Fungi*, Linnæus; *Sphæromyci*, Nees Von Esenbeck. Spore-cases (*sporidia*) naked, without any heterogeneous receptacle, simple; spores minute, globular, and appearing like a granular powder, without fructiferous filaments.

1. White Poplar Mould (*Æ. candida*, Persoon). A white fungus in form of dots, found in autumn on dead wood.—Grev. Crypt. Fl. 268.

2. Bristly Poplar Mould (*Æ. setosa*, Greville). A white, minute, bristle-like fungus, found in autumn on dead wood —Grev. Crypt. Fl. 268. [G. L.]

ÆGICERAS, Gærtner (from the Greek, αἴξ, "a goat," and κέρας, "horn"). Goat's Horn. *Pentandria Digynia*, Linnæus; *Myrsineæ*, R. Brown. Calyx wheel-shaped, with five leathery divisions; corolla cup-shaped; seed-organ many seeded.

1. Great Goat's Horn (*Æ. majus*, Gærtner). A shrub from the Molucca Islands and New Holland: leaves scattered, inversely-egg-oblong, leathery, smooth; flowers white, in axillary umbels. *Rhizophora corniculata*, Linnæus; *A. fragrans*, König.

2. Small Goat's-horn (*Æ. minus*, Gærtner). The *Umbraculum Maris* of Rumphius.—Amb. III. 82. [G. L.]

ÆGILOPS, Linnæus (from the Greek, αἴξ, "a goat," and ὤψ, "eye"). Hard Grass. *Polygamia Monœcia*, Linnæus; *Gramineæ*, Jussieu. Spike three to five flowered; husks two, collateral; chaff two, herbaceous, with a triple beard; stamens three, pistils two, without styles; chaff-scales two, entire; one seed, oblong; male-flowers similar.

1. Tailed Hard Grass (*Æ. caudata*, Linnæus). A hardy annual, one foot high, from the Levant and Italy in 1739: spike cylindrical; husk two-toothed; chaff awnless; propagated by seeds in common soil. *A. cylindrica*, Host. Buxbaum, T. 50, fig. 1.

2. Hairy Hard Grass (*Æ? comosa*, Sibthorp). An annual from the south of Europe: spikes cylindrical, three-flowered; lower flowers toothed, notched, much awned at the top; propagated by seeds in common soil.

3. Porcupine Hard Grass (*Æ? Hystrix*, Nuttal). A perennial, one foot high, from the Missouri in 1819: spikes squarrose, with very long, bent back diverging awns; husk smooth, and for the most part four-parted to the base; valves of the chaff with two or three unequal awns; propagated by division in common soil.

4. Egg-oblong Hard Grass (*Æ. ovata*, Linnæus). An annual, or biennial, ten inches high, from the South of Europe in 1683: spikes egg-oblong; all the husks four-awned, rough; straw ascending; propagated by seeds in common soil.—*Phleum Ægilops*, Scopoli.

5. Rough-spiked Hard Grass (*Æ. squarrosa*, Linnæus). An annual, one foot and a half high, from the East: spikes cylindrical; husk two-toothed, without awns; chaff one-awned; blows in June and July; propagated by seeds in common soil. *Triticum Ægilops*, Beauvois; Shreb. Gram. Tab. 27, f. 2.

6. Three-awned Hard Grass (*Æ. triaristata*, Willdenow). An annual, one foot high, from the South of Europe in 1739: spikes oblong; husks all three-awned; straw erect; blows in July and August; propagated by seeds in common soil. *Æ. ovata*, Roth.

7. Three-inch Hard Grass (*Æ. triuncialis*, Linnæus). A biennial, six inches high, from the South of Europe in 1739: spikes cylindrical; lower husks with two awns; the others with three; awns of the two terminal flowerets longer than the rest; propagated by seed in common soil. [M. K.]

ÆGINETIA, Cavanilles. A genus which is arranged under *Bouvardia*, Salisbury. [A. C.]

ÆGIPHILA, Linnæus (from the Greek, 'αξ, "a goat," and φιλος, "a friend"). Goat Wort. *Tetrandria Monogynia*, Linnæus; *Verbenaceæ*, Jussieu. Calyx four-toothed, very short, loose, permanent; corolla narrow and longer than the calyx, four-cleft; clefts oblong; berry two-celled, roundish, surrounded by the permanent calyx; seed either in pairs or solitary.

1. Woody Goat Wort (*Æ. arborescens*, Willdenow). An ornamental, bark-stove perennial, ten feet high, from Trinidad in 1823: branches four-cornered; leaves oblong, narrowing at both ends, downy beneath; flowers white, in axillary bunches; propagated by cuttings in peaty loam. *Manabea arborescens*, Aublet.—Aublet, Gui. I. 23.

2. Diffuse Goat Wort (*Æ. diffusa*, Andrews). An ornamental, bark-stove perennial, two feet high, from the West Indies in 1804: leaves egg-oblong, lance-shaped, with a long point, smooth on both sides; flowers, in July and August, yellow; panicle diffuse, axillary, and terminal; propagated by cuttings in peaty loam.—Bot. Rep. 578, 1.

3. Tall Goat Wort (*Æ. elata*, Swartz). An ornamental, bark-stove shrub, twelve feet high, from the West Indies in 1823: leaves egg-oblong, blunt, smooth on both sides; flowers, in August, pale yellow, in erect, terminal panicles; propagated by cuttings in peaty loam.—Bot. Reg. 946.

4. Fœtid Goat Wort (*Æ. fœtida*, Swartz). An ornamental, bark-stove perennial, two feet high, from the West Indies in 1800: leaves egg-oblong, lance-shaped, beneath hairy; foot-stalks hairy; flowers, in June and July, lilac; flower-stems axillary, solitary; propagated by cuttings in peaty loam.

5. Smooth Goat Wort (*Æ. lævis*, Willdenow). A shrub from Guiana and Jamaica: branches four-cornered, smooth; leaves egg-oblong, taper-pointed, veiny; flowers in axillary spreading panicles. *Æ. læta*, Humboldt; *Æ. Manabea*, Swartz; *Manabea lævis*, Aublet.

6. Long-leaved Goat Wort (*Æ. macrophylla*, Humboldt). A shrub of South America: leaves egg-oblong, rather leathery, smooth; flowers in axillary smooth bunches. *Æ. lævigata*, Jussieu.

7. Martinico Goat Wort (*Æ. Martinicensis*, Linnæus). An ornamental, bark-stove shrub, six feet high, from the West Indies in 1780: branches opposite, four-cornered, smooth; leaves egg-oblong, lance-shaped, tapering to a point, smooth; flowers, in November, white; panicles terminating or axillary; calyx smooth; propagated by seeds in peaty loam.—Jacq. Ob. II. 27.

8. Soft Goat Wort (*Æ. mollis*, Bonpland). A shrub of South America: leaves inversely-egg-oblong, pointed, indistinctly toothed, woolly; flowers in terminal panicles; style very long.

9. Many-flowered Goat Wort (*Æ. multiflora*, Ruiz). A native shrub of Peru: leaves egg-oblong, taper pointed, woolly beneath; flowers on axillary two-flowered stalks; calyx downy.

10. Mutis's Goat Wort (*Æ. Mutisii*, Bonpland). A South American shrub: leaves egg-oblong, pointed, hairy, woolly beneath; flowers in compact, leafy, terminal panicles; stamens projecting. *Æ. salutaris*, Humboldt.

11. Egg-oblong Goat Wort (*Æ. obovata*, Andrews). An ornamental, bark-stove shrub, two feet high, from the West Indies in 1804: leaves inversely egg-oblong, tapering to a point, smooth on both sides; flowers, in July and August, yellow; panicles axillary and terminal; propagated by cuttings in loam and peat.—Bot. Rep. 578, 2.

12. Three-cleft Goat Wort (*Æ. trifida*, Swartz). A pretty, bark-stove shrub, four feet high: leaves egg-oblong, lance-shaped, smooth; flowers, from June till August, white; flower-stems axillary, three-parted, crowded; propagated by cuttings in peaty loam.

13. Viburnum-leaved Goat Wort (*Æ. viburnifolia*, Jussieu). A native of the Philippine Islands: leaves egg-oblong, rather leathery; flowers in axillary and terminal bunches.

14. Villose Goat Wort (*Æ. villosa*, Willdenow). A native of Guiana: leaves oblong, narrowing at the base, covered with soft hairs beneath; flowers on axillary, spreading flower-stalks; calyx indistinctly toothed. *Manabea villosa*, Aublet. [G. L.]

ÆGLE, Correa de Serra (named from *Ægle*, one of the Hesperides). Hesperidan Fruit, or Bengal Quince. *Polyandria Monogynia*, Linnæus; *Aurantiaceæ*, Jussieu. Calyx three to five-toothed; petals three to five, spreading; stamens thirty to thirty-six, free; anthers long, line-like, sword-pointed; summits of the pistils on short styles; fruit at first berried, finally woody, terminal, round, many-celled; cells many-seeded.

1. Thorny Hesperidan Fruit (*Æ. Marmelos*, Correa). A bark-stove shrub, ten feet high, from the East Indies in 1759: middle leafit stalked; fruit twelve-celled, with an edible pulp; propagated by cuttings in rich loam. *Cratæva Marmelos*, Linnæus.—Rox. Cor. II. Tab. 143.

2. Hedge Hesperidan Fruit (*Æ? sepiaria*, De Candolle). Found in Japan: middle leafit without a foot-stalk; flowers axillary, solitary; fruit seven-celled; pulp unpleasant. *Citrus trifoliata*, Linnæus.—Kæmpfer, Am. 801. T. 802. [G. L.]

ÆGOMARATHRUM, De Candolle. The second section of the genus *Cachrys*. [A. C.]

ÆGOPODIUM Linnæus (from the Greek, 'αξ, "a goat," and ποδιον, "a little foot"). Ash Weed, or Gout Weed. *Pentandria Digynia*, Linnæus; *Umbelliferæ*, Jussieu. Calyx none; petals egg-oblong, notched, with the little segment bent inwards; umbels compound, many rayed; fruit from the side flattish, egg-oblong.

1. Mountain Gout-weed (*Æ. alpestris*, Ledebour). A hardy perennial, from the Altaian mountains: stem smooth; lower leaves with a three-parted foot-stalk; branches wing-cut; segments of the leaves egg-oblong, the lower wing-parted, the upper three-cut; tip longish and rather entire.

2. Common Gout-weed (*Æ. podagraria*, Linnæus). A British perennial, two feet high: root creeping; upper leaves in threes and opposite; leaflets lance-shaped, saw-toothed; umbels with fourteen rays; flowers, from May till July, white. *Tragoselinum Angelica*, Lamarck, Fl. Fr.; *Pimpinella angelicæfolia*, Lamarck, Dict.; *Ligustrum Podagraria*, Crantz; *Seseli Ægopodium*, Scopoli; *Podagraria Ægopodium*, Mœnch; *Sison Podagraria*, Sprengel.—Eng. Bot. 940. [G. L.]

ÆGOPOGON, Willdenow (from the Greek, 'αξ, "a goat," and πωγων, "a beard"). Goat Grass. *Triandria Digynia*, Linnæus; *Gramineæ*, Jussieu. Spikelets in twos or threes, one-flowered, males, lateral and withering;

husks two at top, twice divided, awned, somewhat equal, shorter than the flower; chaff two-valved, the lower three-ribbed, three-awned at the tip; stamens three; seed vessel smooth; chaff-scales smooth, somewhat two-lobed.

1. Millet Goat-grass (*Æ. cenchroides*, Willdenow). A greenhouse perennial, from Mexico: spikelets in threes; propagated by seeds or division in rich soil.

2. Double-flowered Goat-grass (*Æ. geminiflorus*, Humboldt). A perennial from the banks of the Oronoco, and probably a mere variety of the preceding species, distinguished by its twin spikelets; propagated by seeds or division in rich soil.

3. Small Goat-grass (*Æ? pusillus*, Beauvois). An annual, six inches high, from Lima, in 1822: husks pointed, outer valve one-awned; propagated by seed in common soil.

4. Five-bristled Goat-grass (*Æ? quinquesetus*, Roemer). A greenhouse annual from Mexico: valve of the calyx outwardly five-awned; propagated by seeds in rich soil.

5. Three-bristled Goat-grass (*Æ. trisetus*, Roemer). A greenhouse annual from Mexico: valve of the calyx outwardly three-awned; propagated by seeds in rich soil.—Madn. I. Tab. V. f. 3.

6. One-bristled Goat-grass (*Æ. unisetus*, Roemer). A greenhouse annual from Mexico: husks abrupt, notched, one-awned; propagated by seeds in rich soil. [M. E.]

ÆGYPTIACUM. In veterinary science we are directed in the *Pharmacopœia of the Veterinary College*, to take seventeen ounces of verdigris (*subacetate of copper*), six ounces of alum, in powder, twelve ounces of vinegar, and ten ounces of treacle; to boil these gently together, and to add two ounces and a half of sulphuric acid. White says it is a good remedy for thrushes or diseased frogs. [B. E.]

ÆOLLANTHUS, Von Martius (from the Greek, 'αιολλω, "I vary," and 'ανθος, "a flower"). Vary Flower. *Didynamia Angiospermia*, Linnæus; *Verbenaceæ*, Jussieu. A new genus, containing a single species.

1. Fragrant Vary Flower (*Æ. suaveolens*, Von Martius). An ornamental stove annual, one foot high, from Brazil in 1825: leaves spatula-shaped, entire; flowers, in July and August, white; propagated by seeds in sandy loam. [G. L.]

AERANTHUS, Lindley (from the Greek, αηρ, "the air," and ανθος, "a flower"). Air Flower. *Gynandria Monandria*, Linnæus; *Orchideæ*, Jussieu. Lip spurred, membranous, entire, jointed with a claw-formed process of the column, to which the two front divisions adhere; pollen masses two, hollow, perforated on one side, and having two glands.

1. Netted Air Flower (*A. Arachnites*, Lindley). An ornamental, bark-stove perennial, from the Island of Madagascar: spur horizontal, blunt, rather short; calyx erect; flower-stem one-flowered, shorter than the leaves; propagated by division in rich mould, in a very damp atmosphere. *Dendrobium Arachnites*, Thouars.

2. Large-blossomed Air Flower (*A. grandiflora*, Lindley). An ornamental bark-stove perennial, nine inches high, from Madagascar in 1823: leaves two-lobed, and very unequal at the end, shorter than the weak radical sheathed flower-stalk; flowers, in June and July, greenish-yellow; spur, notched; propagated by division in rich mould in a very damp atmosphere.—Bot. Reg. 817.

3. Long-spurred Air Flower (*A. sesquipedalis*, Lindley). A splendid bark-stove perennial, one foot high, from Madagascar in 1823: spur very long, thread-shaped; spikes sheathed, axillary; propagated in rich mould in a very damp atmosphere. *Angræcum sesquipedale*, Thouars. — Thou. Or. 66. [G. L.]

AERATION. The process by which the soil is exposed to the air and imbued therewith, air being indispensable to the healthy growth of plants. When a flower-pot is filled with rather dry earth, if it be plunged under water a profusion of air bubbles will be seen to rise, owing to the water penetrating between the particles of the dry earth and forcing out the air previously lodged there, not imprisoned, as Dr. Darwin and others have alleged, by the tenacity of the soil, but driven down by the superincumbent weight of the atmosphere; consequently the more loose and porous a soil is, the greater quantity of air it will contain, and only wants a due proportion of water to mix with this air in order to render it fertile. It will follow, that the more a soil is ploughed and harrowed, or dug and raked, the better it will be aerated—one of the many beneficial effects of frequently repeating these operations.

Besides the influence of the weight of the atmosphere in pressing air into the interstices of the soil, the agency of water is all important in the process of aeration. All water openly exposed contains more or less atmospheric air; and, in consequence of this, it acquires an agreeable taste, always destroyed by boiling, which renders it vapid and disagreeable by expelling the air.

The importance of air contained in water to the growth of plants, appears from water being found beneficial in proportion as it has had opportunities of becoming mixed with air. It is for this reason that the water of rivers which run a long course, is much better than that of springs and lakes, whose waters contain but a small portion of air, though this does not apply so well to the stagnant water of ponds or ditches, whose deficiency as to atmospheric air is compensated by the greater portion of carbonic acid and other substances derived from decaying animal and vegetable substances usually abundant in such places. But the best water, with respect to the properties of the air it contains, is rain, which, falling in small drops, often tossed about by the wind, has an opportunity of collecting a large proportion of air during its descent to the earth; and hence the smaller the bore of the holes in a garden watering-pot, the better; and the more minutely the garden engine scatters the water, the better, so far as the air is concerned.

There is another point of view in which aeration appears beneficial, arising from the excrementitious matters thrown into the soil by growing plants, as ascertained by M. Macaire; for as these matters become decomposed by fermentation, by exposure to the sun's light, and the like, in the processes of fallowing, irrigation, and draining, the gases there produced would not so readily be carried off from the soil, but for a due circulation of the common air through its interstices. It is important, however, to the proper understanding of this subject, that air and gases do not maintain a position in proportion to their comparative weight; for though carbonic acid gas is so much heavier than the common air, it is found in nearly the same proportion at great heights in the atmosphere as it is on the surface of the earth. Heavy gases will therefore rise into the lighter air around them, though of course more slowly than sulphuretted hydrogen, and the lighter gases. [B. E.]

AERIDES, Loureiro (from the Greek, 'ανϱ, "air"). Air Plant. *Gynandria Monandria*, Linnæus; *Orchideæ*, Jussieu. Calyx with six deep divisions, the five upper ones equal and staged; the lower one with a small concave lip; the anther terminal.

1. Common Air Plant (*A. arachnites*, Willdenow). An ornamental, evergreen, parasite-stove perennial, one foot high, from Japan in 1793: stem branched, rooting; leaves spear-shaped; flowers brownish purple; leaves of the calyx rolled back; lip cleft; propagated by cuttings in rich damp soil, in a very damp atmosphere. *A. flos aëris*, Swartz; *Epidendrum flos aëris*, Linnæus.—Kæmpf. Jap. 869, 1.

2. Horned Air Plant (*A. cornutum*, Roxburgh). A curious evergreen parasite-stove perennial, one foot high, from India in 1800: flowers, in June and July, reddish white, fragrant: propagated by cuttings in rich damp soil.—Bot. Reg. 1485.

3. Long-spiked Air Plant (*A. macrostachyon*, Sprengel). A native of Algiers: spur conical, rather short, bluntish; leaves thong-shaped, unequally two-lobed; flowers in clustered spikes. *Epidendrum macrostachys*, Thouars.

4. Fragrant Air Plant (*A. odoratum*, Loureiro). A curious evergreen, parasite-stove perennial, eighteen inches high, from China in 1800: leaves blunt; flowers pink; lip with the middle lobe the largest; spur awl-shaped and conical; propagated in rich damp soil in a damp atmosphere. *Epidendrum odoratum*, Poiret; *E. Aeridcs*, Raensch; *Limodorum latifolium*, Thunberg.

5. Præmorse Air Plant (*A. præmorsum*, Swartz). A perennial of Malabar: leaves unequally toothed at the tip; spur inflated, bent inwards, blunt; flowers in very long spikes; fruit erect.

6. Retuse Air Plant (*A. retusum*, Swartz). A perennial of Malabar: leaves in two rows, stiff-pointed; spur rather short, very blunt; flowers in very long many-flowered clusters. *Epidendrum retusum*, Linnæus; *Limodorum retusum*, Swartz.

7. Spiked Air Plant (*A. spicatum*, Don). A perennial of Nepaul: leaves line-like, tongue-shaped, abrupt, stiff-pointed; flowers in spikes; spur bagged, descending.

8. Panicled Air Plant (*A. paniculatum*, Ker). A Chinese plant: leaves thong-shaped, unequally two-lobed towards the end; flowers in panicles; spur inflated, blunt. *Vanda paniculata*, Lindley. [G. L.]

AEROBION, Kæmpfer and Sprengel. The genus *Angræcum* of Thouars. [A. C.]

AEROLITES (from the Greek, 'ανϱ, "air," and λίθος, "a stone"). Meteoric stones, which are bodies that fall from the heavens. The origin of these remarkable bodies is still a mystery; but of the truth of their existence, and of their actual descent to the earth from very lofty regions of the air, there can be no doubt. We owe to the Hon. Edward Howard, F.R.S., an admirable paper on the nature and properties of many of these substances. He collected from various quarters authentic specimens, examined their physical characters, and subjected them to a rigid chemical analysis; and the result of his inquiries was, that stones which fell in England, in Italy, in Germany, in the East Indies, and in a great variety of other places, and whose origin rested on the very best testimony, all bore to each other the most perfect resemblance, were all composed of the same substances, and, moreover, that they differed, in many most essential particulars, not only from the minerals of the neighbourhood in which they fell, but also from all hitherto discovered on the earth.

As a general description, we may observe, that these bodies are all covered with a thin crust of a deep black colour, without gloss, and having their surfaces roughened with small asperities. Their internal texture is granulated more or less fine, of a greyish colour, and in which four different substances may clearly be distinguished by a lens. The most abundant vary in size from a pin's head to that of a pea, and are hard enough to produce faint sparks with a steel. Their specific gravity varies from 3·352 to 4·281.

A similar origin has been ascribed to the solitary masses of iron found in Bohemia, Siberia, Senegal, and South America. One in the province of Bahia, in Brazil, is seven feet long, four feet wide, and two feet thick. Its weight is about 14,000 lbs.

In the most authentic instances that have occurred, a luminous meteor exploding with a loud noise, has immediately preceded the descent of these bodies.

It would be easy to form a catalogue of these bodies reaching to the most ancient times, but we shall limit ourselves to some authentic examples of the present century.

Date.	Place and Authority.
1802, September .	Stones in Scotland.—*Monthly Mag.*, Oct. 1802.
1803, April 26th .	Stones in the environs of Aigle.
1803, July 4th . .	Stones at East Norton.—*Phil. Mag.*
1803, October 8th .	A stone near Apt.
1803, Dec. 13th .	Near Eggenfelde.—*Imhof.*
1804, April 5th . .	Near Glasgow.—*Phil. Mag.*
1805, March 25th .	Stones at Doroninsk, in Siberia.—*Gilbert's Annals.*
1805, June . .	Stones at Constantinople.—*Kougas Ingigian.*
1806, May 17th .	A stone in Hampshire.—*Monthly Mag.*
1807, Dec. 14th .	Stones near Weston, in Connecticut.
1808, May 22d . .	Near Stanneru, in Moravia.
1808, Sept. 3d . .	At Lissa, in Bohemia.—*De Schreibers.*
1810, January 30th.	At Casswell, in America.—*Phil. Mag.*
1810, July . . .	A large stone at Shahabad, in India. The meteor caused great havock.—*Phil. Mag.*
1810, August . .	A stone in the county of Tipperary. Higgins has published its Analysis.
1810, Nov. 23d .	Stones at Charronville, near Orleans.
1811, July 8th . .	Stones at Berlanguillas.
1812, April 10th .	Stones near Toulouse.
1812, April 15th .	A stone at Errleben.—*Gilbert's Annals.*
1813, March 14th .	Stones at Cutro, in Calabria, during the fall of a great quantity of red dust.—*Bibl. Brit.*, Oct. 1813.
1814, Nov. 5th . .	At Doab, in India.—*Phil. Mag.*
1815, Feb. 18th .	A stone at Duralla, in India.—*Phil. Mag.*
1818, March 30th .	A stone near Zaborzica, in Volhynia. Analysed by M. Laugier.—*Ann de Museum.*
1824, January . .	Many stones near Arnazzo, in the territory of Bologna, one of them weighing twelve pounds, is preserved in the Observatory of Bologna.—*Diario di Roma.*
1827, October 8th .	A shower of stones near Belostok, in Russia.—*Petersburgh Gazette.*

[P. H.]

AEROMETRIC BEADS. An invention of Mrs. Love, of Edinburgh, for ascertaining the richness of milk, on a similar principle to that of the proof beads employed by spirit dealers. The comparative weight (*specific gravity*) of milk is found to be less when it is rich in cream than when it is poor; and the aerometric beads are so constructed as to point out these qualities. [B. E.]

AEROPHYTON, Eschweiler (from the Greek, *ἀηρ*, "air," and *φυτον*, "a plant"). Vapour Mould. *Cryptogamia Fungi*, Linnæus; *Hyphomycetes Mucorini*, Fries. Flocks jointed, club-shaped at the top; with clavules bearing little capsules, somewhat round and adhering; spore-cases very minute.

1. Prince's Vapour Mould (*Aërophyton Principis*, Eschweiler). A very slender-like fungus, but persistent, and affording an appearance of little trees to the eye; flocks white; branches with joints twice or thrice as long as the diameter of the flocks. On the leaves of *Casilia Braziliensis*. [N. F.]

AERUA, Forskal (the name said to be Arabic). Bran Flower. *Pentandria Monogynia*, Linnæus; *Amaranthaceæ*, Jussieu. Calyx of five leaves; two to three flower-scales (*bracteæ*), oblong, on the outside white, hairy, on the inside smooth; stamens ten, alternately barren, inserted into a little cup at the base; summit of the pistil two-parted.

1. Japan Bran Flower (*A. Javanica*, Jussieu). A bark-stove plant, two-feet high, from the East Indies in 1768: leaves lance-shaped, downy; flowers, from April till August, white; spikes cylindrical, numerous, terminal; propagated by cuttings in rich mould.—Bur. In. 65, 2.

2. Woolly Bran Flower (*A. lanata*, Jussieu). A bark-stove biennial, one foot high, from the East Indies in 1691: stem erect; leaves alternate, egg-oblong; flowers, from April till August, white; propagated by cuttings in rich mould.—Mil. Icon. I. 11, 1. [G. L.]

ÆRUGINOUS (in Latin, *Æruginosus*). Verdigris green.

ÆRUGO. Verdigris, or sub-acetate of copper, used in veterinary practice in making ointments, and as an escharotic.

ÆSCHYNOMENE, Linnæus (from the Greek, *αισχυνω*, "I am ashamed," because the leaves of some of the species fall on the slightest touch). Modesty. *Diadelphia Decandria*, Linnæus; *Leguminosæ*, De Candolle. Calyx five-parted, two-lipped; upper lip two-parted or two-toothed, lower lip three-parted or three-toothed; flowers very often, yellow; clusters axillary; corolla papilionaceous; stamens ten, joined into two equal parcels; pod flattish, jointed across, very straight; seeds solitary, between the joints, kidney-shaped.

I.

LEAVES WITH A FEW PAIRS OF LEAFLETS.

1. Brazilian Modesty (*Æ. Brasiliana*, De Candolle). A native of Brazil: stem diffuse, hairy, glandular; leaflets five to six pairs, egg-oblong, oval, downy, somewhat fringed; bunches straggling, loose, clammy, bristly. *Hedysarum Brasilianum*, Poiret.

2. Elegant Modesty (*Æ. elegans*. Schlecht). A stove annual, three feet high, from Mexico: stem spreading; leaflets five to eight pairs, oval, blunt, stiff-pointed, downy; clusters five to seven-flowered, much longer than the leaves; pod usually six-jointed. *Æ. mimosoides*, Sessé.

3. Sickle-podded Modesty (*Æ. falcata*, De Candolle). A native of Brazil: stem very branched, velvety; leaflets two to three pairs, inversely egg-oblong, wedge-shaped; flower-stems somewhat two-flowered, longish; joints of the sickle-shaped pod somewhat round, downy. *Hedysarum falcatum*, Poiret.

4. Small-flowered Modesty (*Æ. micrantha*, De Candolle). A perennial of Madagascar: stem lying down, downy; leaflets two to four pairs, the least egg-oblong, somewhat round, somewhat sword-pointed, scarcely downy; flower-stalks axillary, one to two flowered, the length of the leaf; joints of the pod smooth, flattish, half-roundish. *Hedysarum micranthos*, Poiret.

5. Few-paired Modesty (*Æ. paucijuga*, De Candolle). A native of Cayenne: stem rounded; leaflets four to five pairs, inversely egg-oblong, blunt, somewhat sword-pointed, scarcely downy; clusters many flowered and compounded; pods rather smooth.

Var. a. Roughish Modesty (*Æ. subscabra*, De Candolle). A native of South America, with the pod roughish from short down.

6. Clammy Modesty (*Æ. viscidula*, Michaux). An ornamental annual, six inches long, from Florida in 1816: stem prostrate, slender; leaflets inversely egg-oblong, three to four pairs; flowers, from July till August, yellow; flower-stems one to two-flowered; joints of the downy pod oval-round; propagated by seeds in sandy loam. *Æ. prostrata*, Poiret.

II.

THE PAIRS OF LEAFLETS NOT MENTIONED.

7. Diffuse Modesty (*Æ. diffusa*, Willdenow). An annual, two feet high, from Tranquebar: stem diffuse, smooth; leaflets line-like, blunt; flower-stems bristly, one-flowered; joints of the pod at the middle, in some very straight, in others somewhat round.

8. Glandulose Modesty (*Æ. glandulosa*, Poiret). A stove shrub, two feet high, from Porto Rico: stem shrubby, rough, with glandular hairs; leaflets line-like, sword-pointed; flower-stem few flowered; joints of the pods four to five, half-pointed at the middle, dotted, prickly.

9. Porcupine Modesty (*Æ. hystrix*, Poiret). A native of Cayenne: leaflets oval, line-like, blunt, stiff-pointed; leaf-stalks with yellow bristles; flower-stems compound, many-flowered; flower-stalks bent backward; pods smooth, few jointed. *M. cassioides*, Desvaux.

10. Velvety Modesty (*Æ. villosa*, Poiret). A stove shrub, two feet high, from Porto Rico: stem somewhat shrubby, velvety; leaflets line-like, blunt, somewhat smooth; flowers small, white; clusters axillary, straggling; pods glandular, hairy.

11. Broad-leaved Modesty (*Æ. latifolia*, Sprengel). A stove annual, two feet high, from Monte Video: leaflets oblong, stiff-pointed, smooth; flowers in many-flowered clusters; pod covered with stiff hairs.

12. Glandular Modesty (*Æ. subviscosa*, De Candolle). An ornamental, bark-stove annual, six inches high, from the East Indies in 1816: stem erect, warty, with small glandular hairs at the tip, rough; leaflets line-like, blunt, smooth; flowers in July and August, yellow; flower-stems somewhat two-flowered; pods hairy, somewhat glandular; propagated by seeds in sandy loam. *Æ. viscidula*, Roxburg, not of Michaux; *Æ. Roxburgii*, Sprengel.

III.

LEAVES WITH MANY PAIRS OF LEAFLETS.

13. American Modesty (*Æ. Americana*, Linnæus). An ornamental bark-stove annual, two feet high, from Jamaica in 1732: stem erect, bristly; leaflets line-like, sword-pointed, ten to twenty pairs, somewhat fringed; flowers, in July and August, yellow; clusters simple, few flowered; joints of the pods four to eight, in some straight, in others somewhat round; propagated by seeds in sandy loam. Sloane, Jam. I. 118. 3.

14. Rough Modesty (*Æ. aspera*, Linnæus). An ornamental bark-stove shrub, six to eight feet high, from the East Indies in 1759: stem erect, tapering; leaflets line-like, thirty to forty pairs; flowers, in June and July, yellow; clusters compound; pods smooth, joints rugged in the middle; propagated by seeds in sandy loam. *Æ. lagenaria*, Loureiro; *Æ. palludosa*, and *Æ. lagenarium*, Roxburgh.—Breyn. Cent. Tab. 52.

15. Fascicular Modesty (*Æ. fascicularis*, Schlecht). A stove shrub, three feet high, from Mexico: stem erect; leaflets twenty or more pairs, line-like, stiff-pointed, smooth above; flowers yellow, in axillary fascicles; pod four-jointed, large.

16. Smooth-podded Modesty (*Æ. glaberrima*, Poiret). A hardy annual, three feet high, from Carolina: stem erect, round; leaflets line-like, thirty to thirty-five pairs, smooth; flower-stems few-flowered; joints of the smooth dotted pod ten to twelve, straight on one side, and rounded on the other: propagated by seeds in sandy loam.

17. Guayaquil Modesty (*Æ. Guayaquilensis*, G. Don). A stove shrub, three feet high, from Guayaquil: plant hispid; leaflets in many pairs, line-like, blunt, stiff-pointed, smooth; flowers on stalks shorter than the leaves; pod with six to eight joints.

18. Bristly Modesty (*Æ. hispida*, Willdenow). An ornamental annual, two feet high, from North America in 1803: stem bristly, erect; leaflets line-like, twenty to thirty pairs, blunt; flowers, in August, yellow; clusters simple, three to five flowered; joints of the pods rough in the middle; propagated by seeds in sandy loam. *Hedysarum Virginiacum*, Linnæus.

19. Magdalena Modesty (*Æ. hispidula*, Kunth). A stove shrub, eight to ten feet high, from the banks of the Magdalena: branches streaked, somewhat wavy; leaflets fifteen to twenty pairs, oblong, line-like, somewhat sword-pointed; flower-stems tubercled, bristly, few-flowered.

20. Indian Modesty (*Æ. Indica*, Linnæus). An ornamental bark-stove annual, two feet high, from the East Indies in 1799: stem erect, rounded; leaflets line-like, fifteen to twenty pairs, smooth; flowers, in June and July, yellow; flower-stems few flowered; joints of the smooth-dotted pod ten to twelve; propagated by seeds in sandy loam. *Hedysarum, Neli Tali*, Roxburgh.—Rheede, Mal. 9. 18.

21. Senegal Modesty (*Æ. macropoda*, De Candolle). A stove annual, three feet high, from Senegal: stem rounded; leaflets line-like, ten to twelve pairs; flower-stems few-flowered; joints of the pod five to seven, smooth.

Var. b. Æ. Belvisii (De Candolle). A stove shrub, two to three feet high, from Prince's Island: leaflets smooth, ten pairs; flower-stems few flowered, glandular, a little downy; joints of the pod four to six, at the middle rough. *Æ. sensitiva*, Beauvois.

22. Small-leaved Modesty (*Æ. microphylla*, Desvaux). A native of Brazil: stem rounded, velvety, bristly; leaflets very small, twenty to thirty pairs, downy, oblong, blunt, crowded; clusters much longer than the leaves; joints of the pods one to two, half egg-oblong, smooth.

23. Spreading Modesty (*Æ. patula*, Poiret). A trailing stove shrub, from the Mauritius in 1826: stem somewhat shrubby; leaflets line-like, blunt, scarcely sword-pointed, ten to fifteen pairs, smooth; joints of the pod four to five, half-roundish, rather downy; propagated by seeds in sandy loam.

24. Many-ribbed Modesty (*Æ. pleuronervia*, De Candolle). A native of St. Domingo: stem round, somewhat erect; leaflets, twenty-pairs, half lance-shaped, provided with a somewhat lateral rib; leaf-scales (*stipulæ*) lance-shaped, streaked; clusters few flowered, somewhat terminal; joints of the downy pod distinct, few, some very straight, others rounded. *Smithia Domingensis*, Balbis.

25. Many-jointed Modesty (*Æ. pluriarticulata*, G. Don). A stove annual, three feet high, from Guayaquil: plant smooth; leaflets line-like, blunt, smooth; pod, with fourteen to eighteen joints, smooth; flower-scales large, saw-toothed; leaf-scales large.

26. Downy Modesty (*Æ. puberula*, De Candolle). A stove shrub, two feet high, from South America: stem with the leaves, flower-stems, and pods, rather rough and downy; leaflets ten-pairs, oval, line-like, blunt, sword-pointed; clusters short, branchy, crowded, many flowered; pods few jointed.

27. Dwarf Modesty (*Æ. pumila*, Linnæus). An ornamental bark-stove annual, six inches high, from the East Indies in 1818: stem smooth, somewhat diffuse; leaflets line-like, blunt, rather sword-pointed, ten to fifteen pairs; flowers, in July and August, yellow; clusters few flowered; joints of the smooth pod few, some straight, others round, in the middle rough.—Rheede, Mal. IX. Tab. 21.

28. Scabrous Modesty (*Æ. scabra*, G. Don). A stove annual, three feet high, from Guayaquil: plant rough; leaflets in many pairs, blunt at both ends; flower-scales saw-toothed; joints of the pod covered with short, sharp points.

29. Sensitive Modesty (*Æ. sensitiva*, Swartz). An ornamental bark-stove shrub, three-feet high, from the West Indies in 1733: stem shrubby, smooth; leaflets line-like, sixteen to twenty pairs; flower-stems few, flowers, in June and July, white; pods and clusters smooth; joints of the pod eight to ten, at the middle smooth, rather hairy at the upper suture; propagated by cuttings in sandy loam. Pl. Ic. 149.

30. Furrowed Modesty (*Æ. sulcata*, Kunth). A stove shrub, twelve feet high, from New Andalusia; branches streaked, furrowed, somewhat wavy, smooth; leaflets seventeen to twenty-one pairs, line-like, rather sword-pointed; joints of the pods seven to nine, smooth.

IV.

SPECIES NOT SUFFICIENTLY KNOWN.

31. Tree-like Modesty (*Æ. arborea*, Linnæus). A stove shrub, seven feet high, from the East Indies: stem tree-like, smooth; flowers large, copper-coloured; pod smooth, with half heart-shaped joints.

32. Short-leaved Modesty (*Æ. brevifolia*, Poiret). A small, smooth plant, six inches high, of Madagascar; leaflets two pair, roundish, stiff-pointed, sea-green; flowers smooth, yellow; pod with three or four distant joints.

33. Crackling Modesty (*Æ. crepitans*, Jacquin.) A stove tree, native of Caraccas: leaves smooth, pods smooth, line-like; seeds divided by a cellular substance; seams prominent, retaining the joints.

34. Divided Modesty (*Æ. divisa*, Nees Von Esenbeck). A stove shrub, three feet high, from Brazil: stem smooth; leaflets twelve to fifteen pairs, line-like, pointed; flower-stems two to three-flowered, shorter than the leaf; joints of the pods half-round, bristly.—Nees et Mart. Nov. Act. Bonn. 12. p. 31.

35. Variable-leaved Modesty (*Æ. heterophylla*, Loureiro). A greenhouse shrub, eight feet high, from Cochin China:

lower leaves in threes, with egg-oblong leaflets; upper leaves unequally winged, with roundish leaflets; flowers small, white, on many-flowered stalks; pod with heart-shaped joints.

36. Bristly Modesty (*Æ. hirsuta*, De Candolle). A stove annual, one foot high, from New Spain; stem hairy, rough; clusters three-flowered; pods rough. *Æ. hirta*, Lagasca, but not Lamarck.

37. Hairy Modesty (*Æ. hirta*, Lamarck). A stove annual, two feet high, from the East Indies: the whole plant hairy; leaflets, seven to nine pair, oval-line-like, stiff-pointed; flowers in terminal many-flowered clusters.

38. Honest Modesty (*Æ. honesta*, Nees Von Esenbeck). A stove shrub, four feet high, from Brazil: branches bristle-like, bristly at the top; leaflets ten to eleven pairs, line-like, blunt, smooth; flowers yellow; standard of the corolla broad, entire; pods somewhat bunchy, at first downy, bristly, afterwards smooth.—Nees et Mart. Act. Bon. 12, p. 32.

39. Delicate Modesty (*Æ. mollicula*, Kunth). An under shrub of South America: branches longish, yellowish, silky; leaflets eighteen to twenty pairs, oblong, line-like, stiff-pointed, half heart-shaped; flower-stems axillary, short, few-flowered; pods sickle-shaped, one to six jointed, hairy, downy; flowers yellow.

40. Oriental Modesty (*Æ. pilosa*, Poiret). A stove annual, two feet high, from the East Indies: stem hairy at the tip, flattish; leaflets oval, stiff-pointed, smooth; clusters rough, many-flowered; joints of the pods rather rough in the middle.

41. Downy Modesty (*Æ. pubescens*, Poiret). A stove plant, two feet high, from the East Indies: stem smooth; branches spreading; leaflets oval, blunt, stiff-pointed, downy; flowers on terminal, many-flowered clusters; joint of the pod rather rough.

42. Broom Modesty (*Æ. scoparia*, Kunth). An under-shrub of the East Indies: branches diffuse, longish, twiggy, straight, angular; leaflets ten to fourteen pairs, oblong, rather sword-pointed, half heart-shaped; flower-stems axillary, few-flowered; flowers yellow. [G. L.]

ÆSCULINE. An alkali discovered by M. Curzoneri in the bark of the *Æsculus Hippocastanum*, supposed to be febrifuge.

ÆSCULUS, Linnæus (from the Latin, *Esca*, "food"). Horse Chestnut. *Heptandria Monogynia*, Linnæus; *Hippocastaneæ*, Jussieu. Calyx one-leaved, bell-shaped; petals four to five, expanded, with an egg-oblong border, irregularly coloured, inserted into the calyx; capsule studded with hard short prickles.

1. Blush Horse Chestnut (*Æ. carnea*, Lindley). An ornamental, hardy, deciduous tree, twenty feet high, from North America; leaflets five, oblong, taper-pointed, saw-toothed; flowers, in July, blush-red, in panicled clusters, downy; petals five; stamens seven; capsules prickly.—Bot. Reg. 1056.

2. Smooth Horse Chestnut (*Æ. glabra*, Willdenow). An ornamental deciduous tree, twelve feet high, from North America in 1822: flowers, in May and June, greenish-yellow; corolla with four petals, with claws the length of the calyx; stamens eight, longer than the corolla; leaflets five, smooth; propagated by grafting.

3. Common Horse Chestnut (*Æ. Hippocastanum*, Linnæus). A timber-tree, forty to sixty feet high, from Asia in 1629: leaves hand-shaped; leaflets seven, inversely egg-oblong, wedge-shaped, pointed, toothed; flowers, in April and May, white; petals five; stamens seven; propagated by seeds in common soil. *Hippocastanum vulgare*, Gærtner.—Schm. Ar. I. 38.

Var. a. Double-flowered (*flore pleno*). Rare.

Var. b. Variegated (*variegata*). Leaves blotched with white.

4. Ohio Horse Chestnut (*Æ. Ohioensis*, Michaux). An ornamental deciduous tree, thirty feet high, from North America: leaflets five, smooth, oval, tapering to a point, irregularly toothed; flowers, in April and May, white; propagated by seeds in common soil.

5. Pale Horse Chestnut (*Æ. pallida*, Willdenow). An ornamental deciduous tree, twelve feet high, from North America in 1812: leaflets five, smooth; flowers, in June, greenish-yellow; stamens doubly longer than the corolla; petals four, spreading, with claws the length of the calyx; propagated by seeds in common soil.

6. Reddish Horse Chestnut (*Æ. rubicunda*, De Candolle). An ornamental deciduous tree, twelve to twenty feet high, from North America in 1820: leaflets five to seven, inversely egg-oblong, wedge-shaped, pointed, unequally doubly saw-toothed; flowers, in June, red; petals five; stamens seven; propagated by grafting. *Æ. carnea*, Watson.—Den. Br. 121. [G. L.]

ÆTHALIUM, Link (from the Greek 'αἰθαλις, "splendid," or rather 'αἰθαλη, "ashes"). Ash Mould. *Cryptogamia Fungi*, Linnæus; *Trichodermaceæ Æthalini*, Fries. A mass at first pulpy, spreading, outwardly velvety or fibrous, membraneous at the base; cellular within.

1. Yellow Ash Mould (*Æ. flavum*, Greville). A small fungus, yellowish brown and flocculent, appearing in autumn on bark in stoves.—Grev. Cryp. Fl. 272.

2. Partitioned Ash Mould (*Æ. septicum*, Fries). *Mucor septicus*, Linnæus; *Reticularia septica*, Bulliard. [N. F.]

ÆTHEILEMA, R. Brown. The generic term under which Brown and Sprengel have described some species of *Ruellia*, or of analogous genera. [A. C.]

ÆTHIONEMA, R. Brown (from the Greek, 'αἰθω, "I scorch," and ῥημα, "chive," from the burnt appearance of the chive or stamen). Scorch-chive. *Tetradynamia Siliculosa*, Linnæus; *Cruciferæ*, Jussieu. Seed-purse (*silicula*) oval, generally notched, valves boat-shaped, on the back winged; cells one or two-seeded; the four taller stamens either united or toothed; seeds egg-oblong.

1. Buxbaum's Scorch-chive (*Æ. Buxbaumii*, De Candolle). A cultivated annual, six inches high, from the Levant in 1823: seed-purses two-celled, two to four-seeded, roundish at the base and at the tip, notched; valves winged at the back and entire; flowers, in June and July, pale red; clusters close; propagated by seeds in common soil.

2. Heart-leaved Scorch-chive (*Æ. cordifolium*, De Candolle). A shrub of Mount Lebanon: three to six inches high; valves winged on the back, entire; leaves line-like, lower spreading; flowers, in June and July, rosy, purplish, larger than in some other species of this genus; seed-purses two-celled, two-seeded, inversely heart-shaped.—Deless. II. T. 76.

3. Crested Scorch-chive (*Æ. cristatum*, De Candolle). An annual, three inches high, of Syria: flowers, in June and July, very small, erect; seed-purses two-celled, two to four seeded, roundish at the base, and at the top notched; valves on the back, winged, crested-toothed.

4. Slender Scorch-chive (*Æ. gracile*, De Candolle). A pretty annual, four to eight inches high, from Carniola in 1820: flowers, in June and July, pale-red; longer stamens toothed; clusters fruit-bearing; seed-purses two-celled, few-seeded, inversely heart-shaped; valves on the back, winged,

somewhat toothed; propagated by seeds in sandy peat. *Thlaspi peregrinum*, Scopoli.—Boc. Mu. 70.

5. Membranous Scorch-chive (*Æ. membranaceum*, De Candolle). An under-shrub, six inches high, from Persia in 1828: leaves line-like, distant; four longer stamens marked with a small tooth at the tip, two shorter ones entire; flowers, in June, lilac; seed-purses two-celled, two-seeded, inversely heart-shaped, crowded, valves on the back, winged, entire. *Lepia membranacea*, Deavaux.

6. One-seeded Scorch-chive (*Æ. monospermum*, R. Brown). A biennial, six inches high, from Spain in 1778: leaves oval, or inversely egg-oblong; flowers, in July and August, pale purple; seed-purses one-celled, and one-seeded, not opening, notched at the tip; propagated by seeds in common soil.

7. Small flowered Scorch-chive (*Æ. parviflorum*, Sweet). An evergreen, hardy perennial, six inches high, from Persia in 1830: flowers, in July, lilac.

8. Milkwort Scorch-chive (*Æ. polygaloides*, De Candolle). An under-shrub of the island of Scio: stem at the base somewhat shrubby; leaves oblong, line-like; seed-purses one-celled, one-seeded, not opening, notched on each side.

9. Rock Scorch-chive (*Æ. saxatile*, R. Brown). A pretty annual, six inches high, from the South of Europe in 1759: leaves lance-shaped, pointed; flowers, in June and July, blush-red; larger stamens toothed; clusters fruit-bearing, loose; seed-purses two-celled, many-seeded, inversely heart-shaped; valves on the back winged, entire; propagated by seeds in common soil.—Jacq. Au. 3, 236.

10. Long-styled Scorch-chive (*Æ. stylosum*, De Candolle). A shrub of Mount Lebanon; leaves egg-oblong, lance-shaped; flowers, flesh-coloured, larger than in the other species of this genus; seed-purses two-celled, two-seeded, valves on the back winged; larger stamens connate. *Thlaspi carneum*, Russel. [G. L.]

ÆTHIOPS MINERAL. In veterinary practice, the black sulphuret of mercury, prescribed in doses to a horse of a drachm or more, once a day in glanders, farcy, mange, and other skin disorders. White recommends it to be combined with equal parts of sulphuret of antimony, and given in doses to a horse of two drachms once a day amongst corn. [B. E.]

ÆTHONIA, D. Don (named from *Æthon*, one of the horses of Phœbus). Sun Plant. *Syngenesia Æqualis*, Linnæus; *Compositæ Cichoraceæ*, Jussieu. A genus separated from *Crepis* and *Hieracium*.

1. Thread Sun Plant (*Æ. filiformis*, D. Don). A greenhouse biennial, eighteen inches high, from Madeira in 1777: flowers, in June and July, yellow; propagated by seeds in common soil. *Crepis filiformis*.

2. Shrubby Sun Plant (*Æ. fruticosa*, D. Don). An evergreen, greenhouse under shrub, two feet high, from Madeira in 1785: flowers, in June and July, yellow; propagated by cuttings in common soil. *Hieracium fruticosum*, Willdenow. [G. L.]

ÆSTIVATION (from the Latin, *æstus*, "summer"). Flower-folding; or as M. Richard terms it, *Prefloration*, a term employed to denote the manner of packing up of the calyx, the corolla, the stamens, and the pistils, before flowering, as will be explained under BUD. [I. K.]

ÆTHUSA, Willdenow (from the Greek, 'αἴθω, "I burn," the juice being acrid). Fool's Parsley. *Pentandria Digynia*, Linnæus; *Umbelliferæ*, Jussieu. Interstices deep, pointed, angular; calyx pointed, very small; petals inversely heart-shaped, rather angular; flowers all perfect, slightly radiant; seeds egg-oblong, convex, with five bulging, rounded, sharply-keeled ribs.

1. Caucasian Fool's Parsley (*Æ. cynapioides*, Bieberstein). An annual, a foot and a half high, from the Caucasus in 1817: segments of the leaves oblong, pointed; umbels rayed, somewhat equal; umbel-fence (*involucrum*) wanting; umblet-fence (*involucellum*) with three leafits shorter than the umblet (*umbellula*); flowers, in July and August, white; propagated by seeds in common soil.—Hoffmann. Um. I. 9.

2. Common Fool's Parsley (*Æ. cynapium*, Linnæus). A British annual, two feet high: segments of the leaves rather blunt; umbels rayed, somewhat equal; umbel-fence wanting; umblet-fence of three leaflets longer than the umblet; flowers, from July to September, white; propagated by seeds in common soil. *Coriandrum cynapium*, Crantz; *Cicuta cynapium*, Targion.—Eng. Bot., 1192.

3. Tall Fool's Parsley (*Æ. elata*, Hoffmann.). An annual, one foot and a half high; segments of the leaves rather blunt; umbel-fence often one-leaved; umblet-fence with one to three leaves, longer than the umblet, the outer rays of the umbel much longer; the front doubly longer than the foot-stalks; flowers, in July and August, white; propagated by seeds in common soil.—Hof. Um. 5, 6, 5.

De Candolle excludes *Æ. Ammi*, *Æ. Bunius*, *Æ. divaricata*, *Æ. fatua*, *Æ. leptophylla*, *Æ. Meum*, *Æ. Mutellina*, *Æ. montana*, and *Æ. pinnata*. [G. L.]

AFFINITY (in Latin, *Affinitas*, from *ad*, "to," *finis*, "end"). Contiguity, kindred, relationship. It is often applied theoretically to plants which resemble each other in form, structure, and qualities. We say theoretically, because there can be no real affinity of parentage, except in the case of hybrids. To say that plants arranged in the same order have an affinity with one another (meaning by affinity a relation of parentage), is not according to the convenient analogical inferences of the naturalist. The term, *family*, is taken from the same analogy, and is of course hypothetical. [B. E.]

AFRICAN ALMOND (*Brabejum*).—AFRICAN FLEA-BANE (*Tarchonanthus*).

AFRICAN LILY (*Agapanthus*). This plant is propagated by offsets, which come from the side of the old plants, and may be taken off the latter end of June, at which time these plants are in their greatest state of rest; when the plants should be turned out of the pots, and the earth carefully cleared away from the roots, that the fibres of the offsets may be better distinguished, which should be separated from those of the old roots, being careful not to break their heads. But where they adhere so closely to the old plant as not to be separated, they must be cut off with a knife, taking great care not to wound or break the roots of either the offsets or the parent plant. When these are parted, they should be planted each in a separate pot, filled with light kitchen-garden earth, and placed in a shady situation, where they may enjoy the morning sun, giving them a little water twice a week, if the weather prove dry; but they must not have too much wet, especially at this season, when they are almost inactive; for as the roots are fleshy and succulent, they are apt to rot with great moisture. In about five weeks' time the offsets will have put out new roots, when the pots may be removed to a more sunny situation, and

then they may have a little more water, which will strengthen their flowering, but it must not be given them too liberally, for the reasons before given.

In September they will put out their flower-stalks; and toward the end of that month the flowers will begin to open, when, if the weather should not be good, they should be removed under shelter to prevent the flowers from being injured by the frost or too much wet; but they should have as much free air as possible, otherwise the flowers will be pale-coloured and weak. Toward the end of October they should be removed into the greenhouse, and placed where they may enjoy as much free air as possible, and not be overhung by other plants; and during the winter they may have a little water once a week, or oftener in mild weather, but in frost they should be kept dry. This plant only requires protection from frost and moisture; it should therefore have no artificial warmth in winter, and must be placed in the open air in summer. [R. M.]

AFRICAN MARIGOLD (*Tagetes erecta*, Linnæus). A favourite hardy annual, which does not come from Africa, but from Mexico. [B. E.]

AFTER-BIRTH. In veterinary practice, will be treated of under PARTURITION. [C. S.]

AFTER-GRASS. In agriculture, the second crop of grass, or that which springs up after mowing, or the grass cut after some kinds of corn crops.

In the vicinity of London most of the after-grass, or second crop, was wont to be made into hay, and was considered of considerable value for the ewes of suckling lambs, and milch cows; but in having this crop, so as to make it sell well, great nicety is requisite, the nature of after-grass being more soft, spongy, and porous than the first growth, and consequently more liable to be hurt by rains. The practice is therefore on the decline.

In the midland counties their management of the feeding off the after-grass is in general judicious. It is commonly suffered to get up to a full bite before it is broken, and not turned in upon as soon as the hay is off, or suffered to stand until much of it becomes improper for the food of animals.

Some able rural economists, however, make a point of saving autumnal grass for spring feed, and contend that it is the most certain, and, on the whole, the best spring feed yet known. This would seem to be a wasteful practice, at least in respect to the more forward after-grasses. The forwardest ought certainly to be broken sufficiently early to be eaten, without waste, before winter sets in; and the latest, that is to say, the shortest, may be shut in for spring feed. If after-grass be too long and gross, it is apt to lodge, and rot upon the ground in winter; therefore, on rich lands, it ought always to be more or less off before Michaelmas, in order to prevent its being wasted or lost in the winter.

Mr. Middleton says, the after-grass is generally let by the farmers at about ten shillings an acre, to be fed off by heavy cattle till such time as the land would receive injury from their poaching, if they were continued on it; and after that by sheep till Candlemas; and sometimes by the latter only, at about three shillings the score per week. This seems a good system for the wetter sorts of ground; but in the more dry soils, heavy stock may be continued much longer.

It has been found from repeated experiments, as will be seen below, that such preserved after-grass feeds sheep that give milk better than turnips, which are more adapted to the fattening of that sort of stock; and that such grass holds to a period, if wanted, when most other resources fail.

But however useful after-grass pastures may be under such management, there is evidently a great loss of food incurred by it, especially in severe winters; it would therefore seem to be, in general, the best practice to eat after-grass well down, as late as possible in the autumn, by different sorts of animals, and depend upon new grass for spring feed.

It is remarked by the author of "Practical Agriculture," that, "In some districts much of the after-grass is frequently cut and made into a green, soft sort of hay, as has been already mentioned; but in others it is fed off by live stock in the autumn." And that "Both modes may be useful under different circumstances. In situations where plenty of manure can be procured, as near large towns, and where the chief dependance is upon the sale of hay, or where lamb-suckling prevails, it may frequently be a beneficial practice to take a second crop of hay, as the first may by that means be more fully spared for sale, the after-crop supplying the cows or other cattle that may be kept on the farm. But in cases where manure cannot easily be obtained, and there is no local practice carried on which requires such sort of hay, it is better to let it be fed off by stock than run the risk of exhausting and injuring the ground by taking off repeated crops. There is also another circumstance," he says, "to be considered in this business, which is, that of the state of the land in respect to dryness, as where it is low, wet, and very retentive of moisture, it may be often more hurt by the poaching of the cattle in feeding off the herbage, than by a second crop of hay." But that, "independent of these considerations, it may, in general, be a more safe and useful practice to eat off the after-grass by stock, and only take one crop of hay, as by such means a more abundant annual produce may be afforded, and the land sustain less injury;" as has been shown in the report of Middlesex.

It is, however, added, that "where a crop of rowen is made into hay, the most profitable application of it is probably in the foddering of such cows as are in milk; as it is well suited, by its grassy quality, and its not heating so much when well made as other sorts of hay in the stack, to afford a large flow of milk. It is this reason that induces the cow farmers to cut their grass so many times in the summer. Another beneficial application of this hay is, as has been seen, in the feeding of such ewes as are employed in the suckling of house-lambs during the winter season; the intention in this case is the same as in that of the preceding instance. There is another advantageous use to which this sort of produce may be applied, which is, that of supporting young calves, and all sorts of young cattle that are kept as store stock." And that "where sheep require the support of hay in the winter season, it is also well adapted to that use."

The same writer likewise observes, that "where after-grass is fed off by the stock, there is much difference of opinion in regard to the most proper periods of turning in the animals. Some have contended that it is the best practice to let them into the field before the young grass has attained any great head; while others maintain the opposite doctrine, and think it the best method to allow the grass to get up to a full bite before the stock is turned upon the land. Both endeavour to support their opinions by experience. But as they cannot be both of them true, it is probable that the extremes of each are to be avoided; and that, as in many other matters, the truth may lie in the middle. This is, indeed, equally supported by fact, and the observation of the most intelligent managers; as when the cattle are turned in too early, there is not a sufficient bite to keep up the condition of the animals; while in the contrary extreme, the stock so soon fill themselves, that much of it is trodden and wasted afterwards in their roaming about the fields to pick the sweetest morsels." In confirmation of this opinion he says, "Marshall found in the midland districts that milch cows fell off in milk, and bullocks in flesh, on being put in too early, before there was a sufficient bite. This he, however, seems to consider as arising from the want of nutritious quality in the grass in this state; and the incautious observation of common farmers has ascribed it to the inconvenience the animals sustain in feeding from the stubs. It is not, however, probable, Dickson thinks, that either is the case; for as soon as the scythe has separated the old grass from the roots, new shoots are made that are highly sweet and nourishing. This may be easily perceived to be the case on examining a piece of ground soon after its being mowed, and tasting the young shoots. The supposition respecting the stubs is shown to be founded in error, from the circumstance of the stock devouring the herbage with avidity, as Marshall has well remarked. Besides, the animals lick in the food by the tongue, (which is armed for the purpose,) before it is bitten, and do not push their noses so as to be inconvenienced by the stiffness of the cut grass stems. It is possible, however, that effect in lowering the condition of the stock may arise from the laxative effect that may be at first produced on the animals by such young succulent grass." But where much stock is turned upon after-grass in a full state of growth, there cannot be any doubt but that much loss must, as has been just observed, be sustained by the treading down and rendering the grass unfit to be eaten off. This is sufficiently evident, he thinks, on viewing fields fed in this state.

It is of course concluded, that, "it is perhaps only by beginning the pasturage of after-grass, when in the middle state of growth, that it can be consumed to the best advantage, and without loss in either of the ways that have been just noticed. This practice seems to be countenanced by Marshall, who has had much opportunity of information on the subject."

In the manner of feeding after-grass, there is also much variety in different districts. "It has," the same author says, "been observed by a farmer in Middlesex, that the condition on which he rents his farm, is that of taking out the cattle at Michaelmas, but that sheep remain till February." In this county the practice is to turn on the cattle immediately after mowing; but in the northern districts, this grass, to which they have given the name of *eddish*, is kept till November, or even a later period, for the purpose of furnishing fat stock, or for the pasturage of milch cows, from which a superior quality of cheese is made, and by which time it has attained a considerable head; however, this latter practice would seem to be attended with some loss, as has been shown from its being trodden and trampled under foot, as may be readily perceived by examining the field. In the stocking of after-grass, Marshall found the midland graziers of opinion, that one cow to an acre, on well-grown after-grass, was an ample stock. Good grass-land may, however, admit something more; and instead of pasturing of rowen, or after-grass, by heavy cattle in the autumn, to avoid poaching the ground, particularly at a late period in that or the winter season, it has been recommended by Dr. Wilkinson, "to confine the consumption of this grass principally to the support of sheep, unless in very favourable seasons, or where the soil is uncommonly dry; in which cases milch cows, or other heavy cattle, may be admitted without inconvenience."

In some places it is the practice, as has been already observed, "where there is a great scarcity of spring feed, to reserve after-grass in the autumn for spring use." Some, on the basis of experience, contend that it is the most certain, and, on the whole, the best spring feed yet known. It would seem, however, as has been shown, to be a wasteful practice, at least in respect to the more forward after-grasses. The forwardest ought certainly to be eaten without waste, before winter sets in; and the latest, that is, the shortest, be shut up for spring feed, as noticed before. Arthur Young, it is stated, found from repeated experiments, as suggested above, "that old after-grass feeds sheep that give milk better than turnips, which are more adapted to the fattening of stock; and that this grass holds to a period, if wanted, when most other resources fail, the last half of April, and the first half of May—periods always of want and difficulty, where rye-grass is not sown." Marshall also assures us, that as a certain and wholesome supply of food for ewes and lambs in the early spring, the preserved pasture is to be depended on as "the sheet anchor, in preference to turnips, cabbages, or any other species whatever, of what is termed spring feed; and the same thing has been experienced by Dr. Wilkinson, who has observed, that "this food with him afforded a more nutritive and healthful quality of milk from the ewes to their tender lambs than turnips, even in their best state. But however useful after-grass pastures may be under this management, there is evidently a great loss of food incurred by it, especially in severe winters.

It has been suggested by Lawrence, that mowing the preserved after-grass in winter, and giving it to the stock in the farm-yard, might be advantageous in preventing the land from being poached, and the useful long grass from being trampled down and destroyed. But the trouble and expence of the process would perhaps, in general, be too much; though in particular circumstances, as where other sorts of fodder do not bear a proportion to the quantity of stock to be kept, and where sheep are conceived improper, it may afford some convenience and benefit, especially where it can be performed without injury to the ground by poaching, in the conveying away the

materials which, perhaps, can seldom be the case, except where the land is very dry, in which situations there is rarely much after-grass for being converted to this use. [H. F.]

AFTERMATH. A provincial term, which is also frequently employed to signify the second crop of grass, or that which springs up after the first has been cut.

AFTER-SWARMS. In the management of bees, those that leave the hive some time after the first set has swarmed, as will be mentioned under SWARMING.

AFZELIA. A name which has been given in honour of *Afzelius*, the successor of Linnæus, to more than one proposed genus of plants; by Walther to a species of *Gerardia*; and by Ehrhart, to some species of *Weissia*, while Smith has given it to some leguminous species—such as *Erythrophleum Guiniense*, G. Don; *Carapa Guiniensis*, G. Don.

AGALLOCHA. The *Excœcaria Agallocha*, Linnæus.

AGAMÆ, Humboldt (from the Greek, α, " privative," and γαμος, " nuptials"). The class of Acotyledonous plants.

AGAPANTHUS, Heritier (from the Greek, 'αγαπητὸς, " delightful," and 'ανθος, " a flower). African Lily. *Hexandria Monogynia*, Linnæus; *Hemerocallideæ*, Jussieu. Calyx a common sheath gaping at the side; corolla one-petalled, funnel-shaped, regular, tube cornered, as if composed of six claws; border six parted; parts oblong, capsule oblong, three-sided, three-celled, three-valved; seeds numerous, oblong, flattish, enlarged with a membrane.

1. Minor African Lily (*A. minor*, Loddige). An ornamental, greenhouse, bulbous-rooted perennial, two feet high, from the Cape of Good Hope: flowers, from January till August, blue; propagated by off-sets in rich mould.—Bot. Cab. 42.

2. Early African Lily (*A. præcox*, Willdenow). An ornamental, greenhouse, bulbous-rooted perennial, four feet high, from the Cape of Good Hope: leaves line-like; flowers, from January till August, pale-blue; flower-stems twice as long as the corolla; propagated by offsets in rich mould.

3. Umbelled African Lily (*A. umbellatus*, Heretier). An ornamental, greenhouse, bulbous-rooted perennial, three feet high, from the Cape of Good Hope in 1692: leaves line-like; flowers, from January till August, blue; flower-stems twice as long as the corolla; propagated by offsets of the root in rich mould. *Crinum Africanum*, Linnæus; *Mauhlia Africana*, Dahl; *Mauhlia linearis*, Thunberg. —Bot. Mag. 500.

Var. a. A. variegatus. An ornamental, greenhouse, bulbous-rooted perennial, two feet high; flowers, from January till August, blue; propagated by offsets of the root in rich mould. [G. L.]

AGARDHIA, Sprengel (named from the Swedish botanist, Agardh). Agardh's Flower. *Monandria Monogynia*, Linnæus; *Rhizophoreæ*, Jussieu. Calyx three-leaved; petals five, convolute; one stamen with a large anther, two-celled; one pistil; fruit oval, three-celled and three-valved. De Candolle says that this genus is altogether doubtful.

1. Indistinct Agardh's Flower (*A. cryptantha*, Sprengel). A tree of Brazil: leaves egg-oblong, pointed, on each side smooth; clusters terminal.

2. Large-blossomed Agardh's Flower (*A. grandiflora*, Sprengel). A tree of Brazil; leaves heart-shaped, oblong, leathery, with parallel ribs beneath, discoloured, velvety, cottony; clusters whirled; flowers velvety, with leaf-stalks and flower-stems at the base, glandular. [G. L.]

AGARIC. In veterinary practice, a sort of fungus, of the genus *Boletus*, found on the decaying trunks of the oak and the ash, formerly much prized as a styptic to stanch bleeding, but now falling into disuse. [B. E.]

AGARICUS (in Greek, 'αγαρικον, said to come from *Agaria*, in Sarmatia). Mushroom. *Cryptogamia Fungi*, Linnæus; *Hymenomycetes Hymenini Pileati*, Fries. A genus comprising between seven and eight hundred described species, and consequently too multitudinous for convenient reference by the botanist, which is one of the chief uses of a generic arrangement. We have therefore deemed it advisable to follow the subdivisions proposed by Fries, each of which we shall consider as a convenient, if not a very distinctly marked genus. Other botanists, such as Persoon, have proposed divisions of Agaricus; but that of Fries seems to be the most complete, and is now very generally adopted. The following is an outline of the genera, which we shall describe in their places. The common mushroom is the *Psalliota campestris*.

AGARICUS.

THE SPORE-BED (*hymenium*) IN PLATES; THE BONNET (*pileus*) WITH GILLS (*lamellæ*) BENEATH, SIMPLE, RADIATING FROM A CENTRE, AND PARALLEL, DIFFERING IN SUBSTANCE FROM THE REST OF THE PLANT.

1. *Stalk* (stipes) *in the centre, and surrounded by the remains of the veil* (velum); *gills not changing; spore-cases* (sporidia) *white.* Containing,

AMANITA. LEPIOTA. TRICHOLOMA.
ARMILLARIA. LIMACIUM.

2. *Stalks in the centre, without any remains of the veil; gills not changing; spore-cases white.* Containing,

CLITOCYBE. GALORRHÆUS. OMPHALIA.
COLLYBIA. MYCENA. RUSSULA.

3. *Stalk out of the centre and at the sides; gills not changing; spore-cases white.* Containing,

PLEUROTUS.

4. *Stalk uniformly in the centre, without any veil; gills changing colour; spore-cases rose-red.* Containing,

CLITOPILUS. LEPTONIA. NOLANEA.
ECCILIA. MOUCERON.

5. *Stalk uniformly in the centre; veil thin, like a spider's web; gills changing colour, and becoming dry; spore-cases ochre-yellow.* Containing,

DERMOCYBE. INOLOMA. TELAMONIA.

6. *Veil not like a spider's web, distinct; gills discoloured, more or less permanent; spore-cases rust-red.* Containing,

HEBELOMA. MYXACIUM. PHOLIOTA.

7. Veil not like a spider's web, very temporary, and soon disappearing; gills discoloured, more or less permanent; spore-cases rust-red. Containing,

Crepidotus.	Galera.	Naucoria.
Flammula.	Inocybe.	Tapinea.

8. Stalk in the centre; veil membranous; gills, when old, brown and dissolving; spore-cases dark-brown or purplish. Containing,

Coprinarius.	Psalliota.	Psilocybe.
Hypholoma.	Psathyra.	Volvaria.

[N. F.]

AGARUM. The *Laminaria Agarum* of Agardh.

AGASTACHYS, R. Brown (from the Greek, '*αγαστος*, "noble," and *στάχυς*, "spike"). Noble Spike. *Tetrandria Monogynia*, Linnæus; *Proteaceæ*, Jussieu. Leaves entire, scattered; numerous spikes of terminal flowers, yellow, each with a four-divided calyx, regular; four stamens inserted in the middle of the leafits of the calyx; the point of the disk glandular; seed-organ much shorter than the stamens; three-cornered, one-seeded, terminated by a one-seeded summit.

1. Fragrant Noble Spike (*A. odorata*, R. Brown). An ornamental, evergreen, greenhouse shrub, three feet high, from New Holland in 1826: flowers, from April till September, pale-yellow; propagated by cuttings in sandy peat. [G. L.]

AGASYLLIS, Hoffmannsegg (in Greek, '*αγασυλλις*, "the Gum Ammoniac plant"), Gum Herb. *Pentandria Trigynia*, Linnæus; *Umbelliferæ*, Jussieu. Margin of the calyx indistinct; petals lance-shaped, bent inwards; fruit oval, on the back flattish; seed nucleus free, sometimes plain, sometimes rather convex, with many bands; stem succulent; leaves downy, three-forked, decompound, segments running down the stem, lance-shaped, somewhat lobed; flowers white.

1. Caucasian Gum Herb (*A. Caucasica*, Sprengel). A hardy biennial, from the Caucasus in 1818: flowers, in July and August, white; propagated by seeds in common soil. *Cachrys latifolia*, Bieberstein; *Siler Caucasicum*, Sprengel; *Cachrys decursiva*, Hornemann.—Spreng. Umb. Prod. p. 22, f. 4. [A. C.]

AGATHÆA, Cassini (from the Greek, '*αγαθος*, "divine"). Elysian Flower. *Syngenesia Superflua*, Linnæus; *Compositæ Jacobeæ*, Jussieu. Umbel-fence with a single range of sharp-pointed leaflets; receptacle honeycombed; the florets of the centre hermaphrodite; florets of the circumference female; seeds flattish, crowned by a sitting tuft of stiff hairs, slightly bearded.

1. Sky-blue Elysian Flower (*A. cælestis*, Cassini). A pretty evergreen, greenhouse, under-shrub, one foot and a half high, from the Cape of Good Hope in 1759: flowers, from February till September, blue; propagated by cuttings in peaty loam. *Cineraria amelloides*, Linnæus.—Bot. Mag., 249.

2. Flax-leaved Elysian Flower (*A. linifolia*, G. Don). A pretty evergreen, greenhouse under-shrub, two feet high, from the Cape of Good Hope in 1800: flowers, from February till September, blue; propagated by cuttings in peaty loam. *Cineraria linifolia*, Linnæus. [G. L.]

AGATHISANTHES, Blume (from the Greek, '*αγαθις*, "a clew of thread," and '*ανθος*, "a flower"). Clew Tree. *Diœcia Decandria*, Linnæus; *Concretaceæ*, Jussieu. Flowers without petals; male calyx five-parted, lobes tiled, approaching; stamens about ten, filaments very short, inserted upon a flat surfaced disk; anthers didymous; female border of the calyx above short, five-toothed; style short, perforating a disk with a flat surface; berry one-seeded.

1. Javanese Clew Tree (*A. Javanica*, Blume). A tree, 120 feet high, found in the higher woods of Java, where it is called "Hirung:" leaves crowded, oblong, entire, leathery; heads axillary or lateral, solitary or in pairs. [G. L.]

AGATHOPHYLLUM, Jussieu (from the Greek, '*αγαθος*, "good," and *φυλλον*, "a leaf"). Clove-leaf Tree. *Dodecandria Monogynia*, Linnæus; *Myrtaceæ*? Jussieu. Calyx abrupt; petals six; fruit one-seeded.

1. Fragrant Clove-leaf Tree (*A. aromaticum*, Willdenow), or Madagascar Nutmeg. An ornamental, bark-stove tree, from Madagascar in 1823: leaves stalked, alternate, inversely egg-oblong, blunt, leathery, entire, smooth; flowers white; propagated by cuttings in sandy peat.—Sonn. Itin. 127. [A. C.]

AGATHOSMA, Willdenow (from the Greek, '*αγαθος*, "good," and '*οσμη*, "smell," the plants having a pleasant smell). Buchu Shrub. *Pentandria Monogynia*, Linnæus; *Rutaceæ*, Jussieu. Calyx with five deep divisions; the corolla formed of ten petals, of which five are larger; capsule with three or five cells, and corresponding valves, each cell enclosing a single seed. *Bucco*, Wendland.

I.

FLOWERS TERMINAL, RATHER DISPOSED IN UMBELS.

1. Leaves line-like, and three-angled.

1. Two-furrowed Buchu Shrub (*A. bisulca*, G. Don). A greenhouse shrub, two feet high, from the Cape of Good Hope: leaves scattered, upright, hairy, furrowed beneath, tip sharp, bent backwards; flowers white, rather hairy; propagated by cuttings in sand, peat, and loam. *Diosma bisulca*, Thunberg; *Diosma bifurca*, Willdenow.

2. Brunian Buchu Shrub (*A. bruniades*, G. Don). An ornamental, evergreen, greenhouse shrub, two feet high, from the Cape of Good Hope in 1820: leaves scattered, awl-shaped, dotted, slightly fringed, flowers, from April to June, white or lilac; propagated by cuttings in loamy peat. *Diosma bruniades*, Link; *Agathosma cuspidata*, Wendland.

3. Upright Buchu Shrub (*A. erecta*, Wendland). An ornamental, evergreen, greenhouse shrub, one to two feet high, from the Cape of Good Hope in 1818: leaves tiled, blunt, dotted beneath, slightly fringed; flowers, from April till June, blue white; propagated by cuttings in loamy peat. *Diosma brevifolia*, Lamarck; *Bucco brevifolia*, Rœmer.

4. Bristly Buchu Shrub (*A. hispida*, Willdenow). An ornamental, evergreen, greenhouse under-shrub, one foot high, from the Cape of Good Hope in 1786: leaves three-cornered, blunt, velvety, bristly, spreading; flowers, from June till August, white, smooth; propagated by cuttings in peaty loam. *Hartogia Capensis*, Linnæus; *Diosma hispida*, Thunberg; *Bucco hispida*, Rœmer.

5. Small-flowered Buchu Shrub (*A. parviflora*, G. Don). An ornamental greenhouse shrub, two feet high, from the Cape of Good Hope; leaves scattered, sharp-pointed, smooth, lightly dotted; flowers small, white; propagated by cuttings in peaty loam. *Diosma parviflora*, Willdenow.

6. Spreading Buchu Shrub (*A. patula*, G. Don). An ornamental, evergreen, greenhouse shrub, two feet high, from the Cape of Good Hope in 1821: leaves blunt, smooth above, rough from furrows beneath, fringed; flowers, from June to August, white; propagated by cuttings in peaty loam. *Diosma patula*, Sprengel.

1. A. ventenatiana, 37. 2. A. obtusa, 27 3. A. latifolia, 21. 4. A. pubescens, 31. 5. A. pulchella, 45.

7. Reflex Buchu Shrub (*A. reflexa*, Link). An ornamental, evergreen, greenhouse shrub, two feet high, from the Cape of Good Hope in 1820: leaves pointed, a little bent back at the tip, with rows of glands on the margin and beneath; flowers, from April till June, purple; propagated by cuttings in loamy peat. *Diosma reflexa*, Loddiges.

8. Slenderest Buchu Shrub (*A. tenuissima*, G. Don). An ornamental, evergreen, greenhouse shrub, one to two feet high, from the Cape of Good Hope in 1820; leaves scattered, upright, bluntish, smooth; flowers, from February till May, white; propagated by cuttings in peaty loam. *Diosma tenuissima*, Loddiges.

9. Rounded-leaved Buchu Shrub (*A ? teretifolia*, G. Don). An ornamental, evergreen, greenhouse shrub, one to three feet high, from the Cape of Good Hope: leaves line-like, convex above, furrowed beneath, blunt, downy; flowers unknown; propagated by cuttings in peaty loam. *Diosma teretifolia*, Link.

10. Cypress Buchu Shrub (*A. thyoides*, G. Don). An ornamental greenhouse shrub, two feet high, from the Cape of Good Hope: leaves tiled, smooth, blunt; branches in whirls; flowers, from April to July, lilac: propagated by cuttings in peaty loam. *Diosma thyoides*, Willdenow.

11. Twiggy Buchu Shrub (*A. virgata*, G. Don). An ornamental, evergreen, greenhouse shrub, two feet high, from the Cape of Good Hope in 1820: smooth, much branched; leaves blunt, upright, very narrow, keeled beneath; flowers, from March till June, white; propagated by cuttings in peaty loam. *Diosma virgata*, Lamarck; *Bucco Lumarckiana*, Rœmer.

2. *Leaves broader and flattish.*

12. Bifid Buchu Shrub (*A. bifida*, Wendland). An ornamental greenhouse shrub, two feet high, from the Cape of Good Hope: leaves rather tiled, line-like, oblong, blunt, fringed, keeled beneath, dotted, smooth; flowers, from April to July, white; petals deeply divided into two line-like lobes: propagated by cuttings in peaty loam. *Diosma bifida*, De Candolle; *Diosma bifida*, Jacquin.—Jacq. Coll. III. T. 20, f. 1.

13. Blærian Buchu Shrub (*A. blærioides*, Nees). An ornamental greenhouse shrub, one foot high, from the Cape of Good Hope: branches very leafy; leaves oval, blunt, leathery, with glandular margins; flowers, with egg-oblong petals, on hairy flower-stalks; propagated by cuttings in peaty loam.

14. Chervil Buchu Shrub (*A. cerefolia*, G. Don). An ornamental, evergreen, greenhouse shrub, two feet high, from the Cape of Good Hope in 1790: leaves tiled, spreading, lance-shaped, fringed; chervil-scented when bruised; flowers, from April to August, white; stamens barren; propagated by cuttings in peaty loam. *Diosma cerefolium*, Ventenat; *Bucco cerefolium*, Rœmer.—Vent. Mal., T. 93.

15. Fringed Buchu Shrub (*A. ciliata*, Willdenow). An ornamental, evergreen, greenhouse shrub, two feet high, from the Cape of Good Hope in 1774: leaves lance-shaped, keeled, fringed; dotted beneath, and the edges rolled back; flowers, in April and May, white; propagated by cuttings in peaty loam. *Diosma capitata*, Dumont, Courset; *Diosma ciliata*, Linnæus.—Bot. Reg., T. 360.

16. Bunch-flowered Buchu Shrub (*A. corymbosa*, G. Don). An ornamental, evergreen, greenhouse under shrub, two feet high, from the Cape of Good Hope in 1818: leaves egg-lance-shaped, fleshy, entire; flowers, from April to July, white, in bunches; propagated by cuttings in peaty loam. *Diosma corymbosa*, Montin.

17. Elegant Buchu Shrub (*A. elegans*, Nees Von Esenbeck). An elegant greenhouse shrub, two feet high, from the Cape of Good Hope: leaves spreading, stalked, egg-oblong, hairy; the edges rolled back and beset with hairs and little glands; flowers with oval, blunt petals; the clusters corymbose; propagated by cuttings in peaty loam.

18. Smooth Buchu Shrub (*A. glabrata*, Bartling). An ornamental, evergreen, greenhouse shrub, two feet high, from the Cape of Good Hope in 1824: plant smooth, leaves tiled, oblong-lance-shaped, convex beneath; flowers, from June to August, lilac; propagated by cuttings in peaty loam. *Diosma leiophylla*, Sprengel.

19. Hybrid Buchu Shrub (*A. hybrida*, G. Don). An ornamental, evergreen, greenhouse shrub, two feet high, from the Cape of Good Hope in 1820: leaves spreading, oblong, blunt, keeled; the keels and edge fringed; flowers, in June and July, lilac or white; propagated by cuttings in peaty loam. *Diosma hybrida*, Sprengel.

20. Woolly-leaved Buchu Shrub (*A. lasiophylla*, G. Don). An ornamental, evergreen, greenhouse under-shrub, one foot

and a half high, from the Cape of Good Hope in 1786: leaves aggregate, line-like, lance-shaped, channelled, glandular, velvety, tiled; branches a little whirled; flowers, from June till August, violet; propagated by cuttings in peaty loam. *A. villosa*, Willdenow; *A. hirta*, Bot. Reg. 369; *Bucco villosa*, Wendland, not of Thunberg.—Wendl., C. vol. I. T. 2.

21. Broad-leaved Buchu Shrub (*A. latifolia*, Willdenow). An ornamental, evergreen, frame shrub, two feet high, from the Cape of Good Hope in 1789: leaves egg-oblong, downy; branches downy; flowers, in July and August, white; flower-stalks at the side, one-flowered; propagated by cuttings. *Baryosma latifolia*, Willd. Enum.

22. Lax Buchu Shrub (*A. laxa*, G. Don). An ornamental, evergreen, greenhouse shrub, two feet high, from the Cape of Good Hope in 1816: leaves tiled, lance-shaped, keeled, the tip bent inwards, downy beneath; flowers, in May and June, lilac; propagated by cuttings in peaty loam. *Diosma laxa*, Sprengel.

23. Flax-leaved Buchu Shrub (*A. linifolia*, Lichtenstein). An ornamental, evergreen, greenhouse shrub, two feet high, from the Cape of Good Hope in 1823: leaves rather line-like, pointed, rough, fringed, covered with transparent dots; flowers, from April till June, white; propagated by cuttings in peaty loam. *Diosma linifolia*, Sprengel.

24. Small-leaved Buchu Shrub (*A. microphylla*, Meyer). An ornamental, greenhouse shrub, two feet high, from the Cape of Good Hope: plant smooth; leaves spreading, oblong, blunt, keeled; flowers reddish, on longish flower-stalks; propagated by cuttings in peaty loam. *Diosma microphylla*, Sprengel.

25. Mundt's Buchu Shrub (*A. Mundtii*, Nees Von Esenbeck). An ornamental greenhouse shrub, two feet high, from the Cape of Good Hope: branches very leafy; leaves spreading, on short stalks; flowers with oblong, blunt, petals, on smooth flower-stalks; propagated by cuttings in peaty loam.

26. Whortle-berry Buchu Shrub (*A. myrsinites*, G. Don). An ornamental greenhouse shrub, two feet high, from the Cape of Good Hope: leaves lance-shaped, flat, fringed, flowers in umbels, on smooth flower-stalks; propagated by cuttings in peaty loam. *Diosma myrsinites*, Lamarck.

27. Blunt Buchu Shrub (*A. obtusa*, Bartling). An ornamental, evergreen, greenhouse shrub, two feet high, from the Cape of Good Hope in 1774: leaves scattered, spreading, oblong-lance-shaped, blunt, rather keeled, the keel and edges fringed; flowers, from April till June, white and purplish, on glandular, hairy flower-stalks; propagated by cuttings in peaty loam. *Diosma ciliata*, Lamarck. *D. thymifolia*, Willdenow; *Bucco obtusa*, Rœmer.—Bot. Cab. 210.

28. Round Buchu Shrub (*A. orbicularis*, Willdenow). An ornamental, evergreen, greenhouse shrub, two feet high, from the Cape of Good Hope in 1800: leaves scattered, speading, round, egg-oblong, or kidney-form, not dotted beneath; flowers, from April till June, white; stamens double the length of the corolla; propagated by cuttings in peaty loam. *Diosma orbicularis*, Thunberg.

29. Perforated Buchu Shrub (*A. perforata*, G. Don). An ornamental greenhouse shrub, one to three feet high, from the Cape of Good Hope: leaves lance-shaped, taper-pointed, slightly fringed, the dots on the edges transparent and rather perforated; flowers in terminal umbels; propagated by cuttings in peaty loam. *Diosma perforata*, Lamarck.

30. Proliferous Buchu Shrub (*A. prolifera*, De Candolle). An ornamental, evergreen, greenhouse shrub, two feet high, from the Cape of Good Hope in 1790: branches whirled, proliferous; leaves spreading, lance-shaped, spear-pointed, keeled; keel and edges fringed, dotted; flowers, from April till June, white; propagated by cuttings in peaty loam. *Bucco prolifera*, Wendland. *Diosma prolifera*, Sprengel.—Wendl. C. 3, 77.

31. Downy Buchu Shrub (*A. pubescens*, Willdenow). An ornamental, evergreen, greenhouse under-shrub, one foot high, from the Cape of Good Hope in 1798: leaves aggregate, oval, blunt, glandular, fringed, spreading; flowers, from May till August, white; propagated by cuttings in peaty loam. *Diosma pubescens*, Thunberg.—Wendl. C. I. 13 14.

32. Dotted-leaved Buchu Shrub (*A. punctata*, G. Don). An ornamental, evergreen, greenhouse shrub, one to three feet high, from the Cape of Good Hope in 1823: leaves round, quite entire, five-ribbed, dotted beneath; flowers, from March to July, white; propagated by cuttings in peaty loam. *Diosma punctata*, Lichtenstein.

33. Wrinkled Buchu Shrub (*A. rugosa*, Link). An ornamental, evergreen, greenhouse shrub, two feet high, from the Cape of Good Hope in 1790: leaves spreading, egg-oblong, blunt, keeled, wrinkled, covered with long loose hairs beneath; flowers, from April till June, white; propagated by cuttings in peaty loam. *Diosma rugosa*, Thunberg; *Agathosma mollis*, Bartling.

34. Wild-thyme-leaved Buchu Shrub (*A. serpyllacea*, Lichtenstein). An ornamental greenhouse shrub, two feet high, from the Cape of Good Hope: leaves crowded, upright, line-like, lance-shaped, the margins fringed, glandular, and rolled back; flowers white?; propagated by cuttings in peaty loam. *Diosma serpyllacea*, De Candolle; *Diosma stricta*, Willdenow.

35. Spiked Buchu Shrub (*A? spicata*, Lichtenstein). An ornamental greenhouse shrub, two feet high, from the Cape of Good Hope: leaves crowded in whorls, line-like, the edges rolled back, flowers in headed spikes; propagated by cuttings in peaty loam. *Bucco spicata*, Rœmer.

36. Thunberg's Buchu Shrub (*A. Thunbergiana*, G. Don). An ornamental, evergreen, greenhouse shrub, two feet high, from the Cape of Good Hope: leaves tiled, lance-shaped, keeled, fringed; flowers, from March till June, lilac; propagated by cuttings in peaty loam. *Diosma ciliata*, Thunberg, not Linnæus; *Diosma Thunbergiana*, Sprengel.

37. Ventenat's Buchu Shrub (*A. Ventenatiana*, G. Don). An ornamental, evergreen shrub, two feet high, from the Cape of Good Hope in 1794: leaves scattered, lance-shaped, keeled, upright, hairy beneath; flowers, from April to July, pale purple, on slightly hairy foot-stalks; propagated by cuttings in peaty loam. *Diosma hirta*, Ventenat; *D. purpurea*, Hort.; *D. Ventenatiana*, Sprengel; *D. glandulosa*, Thunberg; *Bucco Ventenatiana*, Rœmer.—Vent. Malm. T. 72.

Var. a. Whitish-flowered (*A. exsiccata*, Lamarck). The flowers of a whitish hue.—Lam. Dict. 2, p. 286, T. 127, f. 3.

38. Wendland's Buchu Shrub (*A. Wendlandiana*, G. Don). An ornamental, greenhouse shrub, two feet high, from the Cape of Good Hope in 1816: leaves oblong, pointed, tiled, channelled, smooth, dotted; flowers, from April to July, white, in two or three-flowered umbels; propagated by cuttings in peaty loam. *Bucco erecta*, Wendland.—Wendl. Coll. 1, T. 3.

II.

FLOWERS TERMINAL, IN KIND OF HEADS.

39. Taper Buchu Shrub (*A. acuminata*, Willdenow). An ornamental, evergreen, greenhouse shrub, one to five feet high, from the Cape of Good Hope in 1812: leaves egg-shaped, somewhat heart-shaped, tapering to a point, downy, dotted; flowers, in April and June, violet, in terminal umbelled branches; propagated by cuttings in peaty loam. *Bucco acuminata*, Wendland.—Wendl. I., T. 28.

40. Pointed-leaved Buchu Shrub (*A. apiculata*, Meyer). An ornamental, greenhouse shrub, two feet high, from the Cape of Good Hope: leaves crowded, spreading, slightly rolled back, egg-oblong, rather heart-shaped, awned, not dotted; flowers white or lilac; propagated by cuttings in peaty loam. *Diosma apiculata*, Sprengel.

41. Hairy Buchu Shrub (*A. hirta*, G. Don). An

ornamental, greenhouse shrub, two feet high, from the Cape of Good Hope: leaves rather tiled, line-like, awl-shaped, channelled, hairy on the back; flowers in dense heads; petals white, bearded at the claws; propagated by cuttings in peaty loam. ***Diosma hirta***, Lamarck.

42. Tile-leaved Buchu Shrub (***A. imbricata***, Willdenow). An ornamental, evergreen, greenhouse shrub, three feet high, from the Cape of Good Hope in 1774; leaves aggregate, egg-oblong, tapering to a point, tiled, dotted, fringed; flowers, from April till June, pale purple; propagated by cuttings in peaty loam. ***Diosma imbricata***, Thunberg; ***Bucco imbricata***, Wendland; ***Hartogia imbricata***, Linnæus.—Wendl., C. 1, T. 9.

43. Lycopodian Buchu Shrub (***A. lycopodioides***, G. Don) An ornamental greenhouse shrub, two feet high, from the Cape of Good Hope: leaves closely tiled, egg-oblong, spear-pointed, downy beneath; flowers white?, with roundish petals, on downy flower-stalks; propagated by cuttings in peaty loam. ***Diosma lycopodioides***, Willdenow.

44. Blunt-leaved Buchu Shrub (***A. obtusata***, G. Don). An ornamental, greenhouse shrub, two feet high, from the Cape of Good Hope: leaves collected together, rather three-cornered, blunt, short, rough, dotted; flowers pale flesh-coloured; propagated by cuttings in peaty loam. ***Bucco obtusata***, Wendland.—Wendl. Coll. III. T. 76.

45. Pretty Buchu Shrub (***A. pulchella***, Willdenow). An ornamental, evergreen, frame shrub, three feet high, from the Cape of Good Hope in 1789: leaves egg-oblong, glandular, smooth; flowers, from February to September, purple; propagated by cuttings.—Bot. Rep. 451.

46. Reddish Buchu Shrub (***A. rufescens***, G. Don). An ornamental evergreen shrub, two feet high, from the Cape of Good Hope: leaves crowded, rather three-cornered, awl-shaped, smooth, the edges rolled back; flowers lilac; calyx and flower-stalks reddish; propagated by cuttings in peaty loam. ***A. rubrum***, Willdenow; ***Diosma rufescens***, Sprengel.

47. Scaly Buchu Shrub (***A. squamosa***, G. Don). An ornamental, evergreen, greenhouse under-shrub, two feet high, from the Cape of Good Hope in 1818: leaves closely tiled, roundish egg-shaped, blunt, concave, scaly beneath; flowers, from April to July, white; propagated by cuttings in peaty loam. ***Diosma squamosa***, Willdenow.

48. Clothed Buchu Shrub (***A. vestita***, G. Don). An ornamental, evergreen, greenhouse shrub, two feet high, from the Cape of Good Hope in 1824: leaves closely tiled, egg-oblong, taper-pointed, keeled, fringed; flowers, from April till June, lilac; propagated by cuttings in peaty loam. ***Bucco vestita***, Lichtenstein; ***Diosma vestita***, Sprengel.

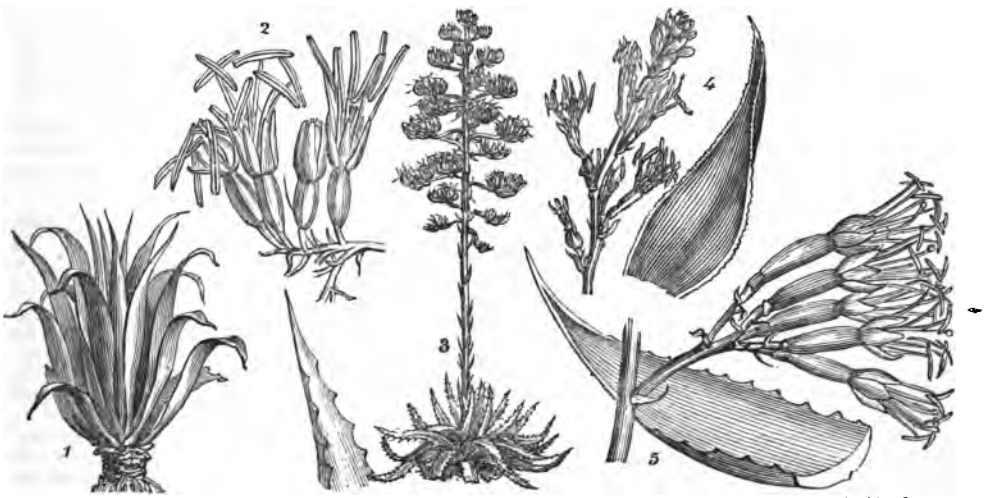
[G. L.]

AGATI, Rheede (in Sanscrit ***Agaty***). Agaty Tree. ***Diadelphia Decandria***, Linnæus; ***Leguminosæ***, Jussieu. Calyx bell-shaped, abrupt, bluntly-five-toothed; standard of the corolla oval-oblong with short oblong wings; seeds in cells, solitary, flattish across, oval; leaves abruptly winged, many-yoked; flowers large; clusters few-flowered.

1. Scarlet Agaty Tree (***A. coccinea***, Desvaux). An ornamental bark-stove tree, twenty-six feet high, from the East Indies in 1768: leaflets powdery; pods rather rounded; flowers, in July and August, red; propagated by cuttings in peaty loam. ***Sesbania coccinea***, Poiret.—Rum. Am., I. 77.

2. Large-flowered Agaty Tree (***A. grandiflora***, Desvaux). An ornamental bark-stove tree, from the East Indies in 1820: flowers, in July and August, rusty yellowish according to Forskahl, white or rosy red according to Roxburgh and Perrotet; propagated by cuttings in peaty loam. ***Sesbania grandiflora***, Poiret.—R. Mal., I. 51. [G. L.]

AGAVE, Linnæus (from the Greek, '*αγαυος*, "noble"). Maguey. ***Hexandria Monogynia***, Linnæus; ***Bromeliaceæ***, Jussieu. Calyx none; corolla one-petalled, funnel-shaped, border six-parted, equal, parts lance-shaped, erect, superior; capsule oblong, three-cornered, three-celled, and three-valved; seeds numerous.



1. A. fœtida, 4. 2 and 3. A. Americana, 1. 4. A. Virginiaca, 10. 5. A. lurida, 6.

1. American Maguey (***A. Americana***, Linnæus), or Great American Aloe. An ornamental, evergreen, greenhouse perennial, twenty feet high, from South America in 1640: stemless; leaves toothed, thorny; flowers, from August till October, yellow, and often with new flowers every three months; flower-stalks from the root, very tall, branchy; tube of the corolla contracted in the middle; propagated by suckers in rich mould.—Bot. Rep., 438.

2. Narrow-leaved Maguey (***A. angustifolia***, Haworth). An ornamental, evergreen, dry stove perennial, six feet high; leaves narrow, lance-shaped, sea-green, saw-toothed; flowers, green; propagated by suckers in rich mould.

3. Short-spiked Maguey (*A. brachystachys*, Cavanilles). An evergreen stove perennial, three feet high, from Mexico in 1826: leaves line-like, channelled, stiff, pointed, entire; flowers without stalks; stamens projecting; flowers, in summer, green; propagated by suckers in rich soil. *A. spicata*, Redouté, Lil., 485.

4. Fœtid Maguey (*A. fœtida*, Linnæus). An ornamental, evergreen, dry-stove perennial, twenty feet high, from South America in 1690: leaves entire; flowers, from January to September, green; flower-stem tall; propagated by suckers in rich mould. *Furcræa gigantæa*, Ventenat.—Bot. Mag. 2205.

5. Karatto Maguey (*A. Karatto*, Miller). An evergreen dry stove perennial, five feet high, from South America in 1768: leaves erect, bright green, with an entire brown edge; flowers green; propagated by suckers in rich mould.

6. Lurid Maguey (*A. lurida*, Jacquin). An ornamental, evergreen, dry stove perennial, eight feet high, from Vera Cruz in 1731: a little stemmed; leaves toothed, thorny; flowers, in June and July, green; flower-stem branched; stamens longer than the cylinder and corolla; propagated by suckers in rich mould.—Bot. Mag., 1522.

7. Mexican Maguey (*A. Mexicana*, Haworth). An ornamental, evergreen, dry stove perennial, six feet high, from Mexico in 1817: leaves smooth, lance-shaped, upright, spreading, dark purple above, edges beset with small, pale spines; propagated by suckers in rich mould.

8. Miller's Maguey (*A. Milleri*, Haworth.) An ornamental, evergreen, dry stove perennial, six feet high: leaves smooth, toothed, thorny; flowers green; flower-stems quite simple; propagated by suckers in rich mould.

9. Thorny Maguey (*A. polyacantha*, Haworth). An ornamental, evergreen, dry stove perennial, six feet high: flowers, from August till September, green; propagated by suckers in rich mould.

10. Virginian Maguey (*A. Virginiaca*, Linnæus). An ornamental, frame perennial, three feet high, from North America in 1765: stemless; leaves gristly, sawed; flowers, in September, pale green; flower-stem simple; propagated by suckers in rich mould.—Bot. Mag., 1157.

11. Viviparous Maguey (*A. vivipara*, Linnæus). An ornamental, evergreen, dry stove perennial, fifteen feet high, from South America in 1731: stemless; leaves toothed; flowers, from August till October, green; flower-stalk branched; tube of corolla narrowed in the middle; propagated by suckers in sandy peat.—Com. Pr. 15.

12. One-striped Maguey (*A. univittata*, Haworth). An ornamental, evergreen, stove perennial, from Mexico in 1830: propagated by cuttings in rich soil.

13. Yucca-leaved Maguey (*A. yuccæfolia*, Willdenow). An ornamental, evergreen, dry stove perennial, six feet high: leaves strap-shaped, erect, bent back, sea-green above, channelled with marginal minute dense white saw-teeth; flowers yellowish white; propagated by suckers in rich mould. [G. L.]

AGDESTIS, Mocino (from *Agdestis*, in mythology). Furrow Seed. *Polyandria Tetragynia*, Linnæus; *Menispermaceæ*, De Candolle. Flowers with both stamens and pistils; divisions of the calyx four; petals none; stamens twenty-four; anthers two-parted at both ends; seed-organ four-furrowed; summits of the pistils four, spreading, somewhat bent back at the tip.

1. Clematidean Furrow Seed (*A. clematidea*, Mocino). A climbing stove shrub of New Spain: leaves heart-shaped, taper-pointed; flowers rusty, similar to *Clematis flammula*, in size and number of the leaves of the calyx; fruit unknown; propagated by cuttings in loamy peat. [A. C.]

AGE OF ANIMALS. The marks of the several stages of life in the horse and dog are chiefly taken from the TEETH, as will be shown when we come to treat of these; in the cow and the sheep both the teeth and the horns are examined to determine the age.

AGE OF PLANTS. In vegetable physiology, the age or duration of individuals is considerably diversified in different tribes. Some have their age bounded by the term of a single year or season, and are hence called annuals. Some have it extended to a period of two years, and are hence called biennials. Others live to an indefinite period, and are hence called perennials; of which tribe some particular species are most singularly long-lived. A few of the most extraordinary examples of protracted vegetable existence will be given under LONGEVITY OF PLANTS. [I. K.]

AGERATUM, Linnæus (from the Greek, α, "privative," and γηρας, "old age"). Oldless. *Syngenesia Æqualis*, Linnæus; *Compositæ*, Jussieu. Common calyx, oblong, with many lance-shaped, somewhat equal scales; corolla four to five, cleft; receptacle naked, downy, five-awned; seed solitary, oblong, angular, crowned with a chaffy, five-leaved, upright, awned cup-fence (*caliculus*).

1. Narrow-leaved Oldless (*A. angustifolium*, Sprengel). An ornamental, greenhouse annual, one foot high, from Monte Video in 1827: stem erect, branches hairy; leaves line-like and lance-shaped, rough, nearly stalkless; flowers, from June to August, white, on one-flowered, longish, smooth stalks; propagated by seed in common soil.

2. Arbutus-leaved Oldless (*A. arbutifolium*, Kunth). A native of New Spain: stem shrubby, very much branched; leaves oval-oblong, blunt, notched, leathery, smooth, almost stalkless; flowers in bunches.

3. Ciliary Oldless (*A. ciliare*, Linnæus). An East Indian perennial: stem smooth; leaves egg-oblong, blunt, notched; flowers in bunches.

4. Blue Oldless (*A. cæruleum*, Persoon). An ornamental, greenhouse annual, one foot high, from the West Indies in 1800: flowers, from June till August, blue; propagated by seeds in common soil.—Hooker, Exot. Fl. 15.

5. Flea-bane Oldless (*A. conyzoides*, Linnæus). An ornamental annual, one foot high, from America in 1714: leaves egg-oblong, somewhat heart-shaped; stem hairy; chaff of the down awned, minutely toothed; flowers, in July and August, light blue; propagated by seeds in peaty loam.—Schk. Han. III. 238.

6. St. Domingo Oldless (*A. Domingense*, Sprengel). A native of St. Domingo: stem lying on the ground, smooth; leaves stalked, heart-shaped, roundish, stiff-toothed; flowers on one-flowered stalks.

7. Broad-leaved Oldless (*A. latifolium*, Cavanilles). An ornamental annual, a foot and a half high, from Peru in 1800: leaves egg-oblong, wedge-shaped at the base; stem hairy; chaff of the down lance-shaped, sharp pointed; flowers, in July and August, white; propagated by seeds in common soil.—Cavan. Icon., IV. 357.

8. Mexican Oldless (*A. Mexicanum*, Curtis). An ornamental annual, a foot and a half high, from Mexico in 1822: bristly; leaves heart-shaped, egg-oblong, nicked, wrinkled; flowers, in June and July, blue; flower-bundle compound; chaff of the down lance-shaped, awned; propagated by seeds in common soil.

9. Straight Oldless (*A. strictum*, Sims). An ornamental annual, two feet high, from Nepaul in 1821: stem erect, simple, rough; leaves heart-shaped, wrinkled, unequally saw-toothed; flowers, in June and July, white; propagated by seeds in common soil.—Bot. Mag. 2410.

[G. L.]

AGERIA. 1. The *Pæderota Ageria* of Linnæus. 2. Second section of *Prinos*, De Candolle. [A. C].

AGGLOMERATED (in Latin, *Agglomeratus*). Collected into a mass or head.

AGGREGATÆ, Lindley. Aggregate plants, a cohort of the class *Exogeneæ Angiospermæ*, and sub-class *Monopetalæ*. It is characterised by the ovary and fruit being monocarpic, or containing only one fertile cell. Five Nixus belong to it: *Astrales*, *Dipsales*, *Brunoniales*, *Plantales*, and *Plumbales*. [K. A.]

AGISTMENT. A term seemingly from the old law French word *Giste*, which signifies a lying-place, and therefore, as applied to cattle, supposes pasturing. Agistment accordingly is the pasturing of cattle, the property of another, on the payment of a certain sum of money, or other valuable consideration; and the animals thus grazed are sometimes called *Gistments*. Agistment also means the profit arising from this practice. The tithe of agistment is the tenth part of the value for the keeping or depasturing such cattle as are liable to pay it; but it may be avoided by cutting the grass for stall-feeding. [E. A.]

AGLAIA, Loureiro (from *Aglaia*, one of the Graces, the species being beautiful). Aglaia's Tree. *Monadelphia Pentandria*, Linnæus; *Aurantiaceæ*, Jussieu. Calyx five-parted; stamens five; filaments as in the *Meliaceæ*, united into an egg-oblong tube, anthers closed; summit of the pistil broad, sitting; seed-organ one-celled, with two nascent seeds; berry one-seeded.

1. Silver-leaved Aglaia's Tree (*A. argentea*, Blume). A handsome stove tree, thirty feet high, from Java: leaves of many pairs of heart-shaped, oblong, taper-pointed leaflets, silvery beneath; flowers in panicles; propagated by cuttings in turfy loam and peat.

2. Decandrous Aglaia's Tree (*A. decandra*, Wallich). A fine stove tree, about fifty feet high, from Nepaul: leaves usually of six pairs of oblong, taper-pointed, leaflets, downy on both sides; flowers yellow, small, sweet-scented, in axillary, downy panicles; propagated by cuttings in turfy loam and peat.

3. Oval-leaved Aglaia's Tree (*A. elliptica*, Blume). A stove shrub, native of Java: leaves consisting generally of two pairs of oval-oblong leaflets, clothed with rusty down beneath; flowers in loose longish panicles; propagated by cuttings in turfy loam and peat.

4. Fragrant Aglaia's Tree (*A. odorata*, Loureiro). A beautiful greenhouse shrub, six to twelve feet high, from China in 1810: leaves winged, with five or seven glossy leaflets; flowers, from February to May, small, yellow, sweet-scented; berries red, eatable; propagated by cuttings in turfy loam and peat. *Cumunium Sinense*, Rumphius; *Ophilia odorata*, Sprengel.—Rumph. Amb. 5, T. 18.

5. Very Fragrant Aglaia's Tree (*A. odoratissima*, Blume). A handsome stove shrub, six to ten feet high, from Java: leaves commonly of two pairs of oblong, blunt leaflets; flowers, small, yellow, very sweet scented, in pyramidal panicles; propagated by cuttings in turfy loam and peat.

6. Many-spiked Aglaia's Tree (*A. polystachia*, Wallich). An elegant stove tree, about forty feet high, from the East Indies: leaves of a few pairs of oblong, lance-shaped, taper-pointed, smooth leaflets; flowers small, yellow, sweet-scented, in axillary panicled clusters; propagated by cuttings in turfy loam and peat.

7. Showy Aglaia's Tree (*A. speciosa*, Blume). A showy stove-tree, twenty feet high, from Java: leaves usually of four pairs of oblong-lance-shaped, pointed leaflets, covered with brown scales beneath; flowers in panicles; propagated by cuttings in turfy loam and peat.

8. Suling's Aglaia's Tree (*A. Sulingi*, Blume). A handsome stove tree, native of Java: leaves consisting generally of two pairs of oval-oblong, bluntish-smooth leaflets; flowers in bunchy panicles; propagated by cuttings in turfy loam and peat. [A. C.]

AGNOSTUS, Cunningham (Latin "unknown"). Moreton Tree. *Tetrandria Monogynia*, Linnæus; *Proteaceæ*, Jussieu. A new provisional genus not much known.

1. Wavy Moreton Tree (*A. sinuata*, Cunningham). An evergreen, greenhouse tree, fifteen feet high, from New Holland in 1830: leaves scolloped; propagated by cuttings in rich soil. [G. L.]

AGONIS, De Candolle. The first section of the genus *Leptospermum*. [A. C.]

AGRICULTURE. We shall, in the present article, limit ourselves to a brief historical sketch of Agriculture, which became one of the sustaining arts of life as soon as man was ordained to earn his bread by the sweat of his brow. In the garden of Eden, whose fertile soil and genial clime appear to have combined in maturing a continued variety and unfailing succession of vegetable sustenance, agricultural operations were unknown; for that which came spontaneously to perfection, required no assistance from human ingenuity; and where there is no deficiency there can be no inducement to strive for improvement. That period of perfection was but transitory; and the Deity that had placed man in the garden "to dress it and keep it," eventually drove him thence "to till the earth from whence he was taken."—*Gen.* ii. 15; iii. 23.

From that time to the present agriculture has been an improving art; and there is no reason to doubt but that it will go on advancing as long as mankind continues to increase.

Man, in his greatest state of ignorance, is always found dependant for subsistence upon the produce of the chace; but, as population increases, recourse must be had to other sources of food. And we find in the shepherd's life of the early ages, the first step of the agricultural art, the domestication of animals, which it was found to be more convenient to have constantly at hand, rather than to have to seek precariously at the very time they were required. As the increase of population still went on, and the flocks and the herds had proportionately to be enlarged, one favourite spot would be found too small for the subsistence of the whole; and, as in the case of Abraham and Lot, they would have to separate and find pasturage in different districts. This separation into tribes could not proceed beyond a certain extent; and when the land was fully occupied, recourse would by necessity be had to means of increasing the produce of given surfaces of soil instead of enlarging their extent. With Abraham and Isaac it is very evident that wheat and the other fruits of the earth were the rare and choice things of their country; but when such nations once learned, as they might from the example of Egypt, the resource such products were in periods of famine, arising from mortalities among their cattle, they would soon pursue their interests by cultivating them. This completed, the acquirement of property in land for the space not

only long occupied, but upon which the occupier had bestowed his labour, built his habitation, and had enclosed from injury by vagrant animals, would be acknowledged to be his without any one stopping to inquire what right he had to make the enclosure.

When once thus located, experience and observation would soon teach the employment of manures, irrigation, times of sowing, and other necessary operations; and every generation would be wiser in the art than that which preceded it. This especially has occurred in these more northern climates, where art and industry has to compensate for a deficiency of natural advantages. "Enlarging numbers," observes Mr. Sharon Turner, "only magnify the effect; for mankind seem to thrive and civilise in proportion as they multiply; and, by a recurrent action, to multiply again in proportion as they civilise and prosper." In this manner improved modes of cultivation, the introduction of new species, and of more fruitful varieties of agricultural produce, have universally kept pace with an increasing population. This resting upon a basis of facts, vindicates the wisdom of Providence, and refutes Mr. Malthus's superficial theory of over-production. The agricultural produce of this country has gradually increased from the insignificant amount that was its value in the time of the Roman invasion, to the enormous annual return of 200,000,000*l.*; and it is very certain that in this country, and much more in other parts of the world, the produce is a mere fraction of what the total soil is capable of returning.

Agriculture is the art of obtaining from the earth food for the sustenance of man and his domestic animals; and the perfection of the art is to obtain the greatest possible produce at the smallest possible expence. Upon the importance of the art, it is needless, therefore, to insist; for by it every country is enabled to support in comfort an abundant population. On this its strength as a nation depends; and by it its independance is secured. An agricultural country has within itself the necessaries and comforts of life; and, to defend these, there will never be wanting a host of patriot soldiers.

Of the pleasure attending the judicious cultivation of the soil, we have the evidence of facts. The villa farms sprinkled throughout our happy land, the establishments of Holkham, Woburn, &c. would never have been formed if the occupation connected with them was not delightful. We have an unexceptionable witness to the same fact in Mr. Roscoe, the elegant, talented author of the Lives of Lorenzo de Medici and of Leo the Tenth. Mr. Roscoe was the son of an extensive potatoe grower near Liverpool. In the cultivation of that and other farm produce, he had been an active labourer; and he who thus had enjoyed the delights that spring from literary pursuits, and from the cultivation of the soil, has left this recorded opinion, "If I was asked whom I consider to be the happiest of the human race, I should answer, those who cultivate the earth by their own hands."

We have but little information to guide us as to the country in which man first cultivated the soil; nor of that in which he first settled after the deluge. Thus much, however, is certain, that we have the earliest authentic account of the state of agriculture as it existed among the Egyptians and their bondservants, the Israelites. From the former, probably, the Greeks were descended. The Romans, at a later period, were a colony from Greece; and from the Romans the other countries of Europe derived their earliest marked improvement in the arts.

Our brief history of the progress of agriculture, then, will be divided into, 1st. The Agriculture of the Egyptians and other eastern nations; 2d. The Agriculture of the Greeks; 3d. The Agriculture of the Romans; 4th. The Agriculture of the Britons, including a cursory notice of its present state among the chief nations of Europe.

I.

THE AGRICULTURE OF THE EGYPTIANS, ISRAELITES, AND OTHER EARLY EASTERN NATIONS.

Every family of these primitive nations had its appointed district for pasturage, if it pursued a pastoral life; or its allotted inclosure if it was occupied by tilling the earth. There was no distinction in this respect between the monarch and his people; each had a certain space of land from which he and his family were to derive their subsistence.

The Egyptians, as well as the Israelites, were flock-masters. The latter were particularly so; amd, as Joseph's brethren said to Pharaoh, "their trade was about cattle from their youth" (*Gen.* xlvi. 34). When, therefore, they came into Egypt, they desired the low-lying land of Goshen, as producing the most perennial of pasture (*Gen.* xlvii. 4). It is true that the same authority says, "every shepherd is an abomination unto the Egyptians;" but this was because, about a century before the arrival of Joseph among them, a tribe of Cushite shepherds from Arabia had conquered their nation, and held them in slavery; till after a sanguinary contest of thirty years, they regained their liberty about twenty-seven years before Joseph was promoted by Pharaoh. That the Egyptians were flock-masters is certain, from many parts of the Scriptures. Thus, when Pharaoh gave permission to the Israelites to dwell in Goshen, he added, as he spoke to Joseph, "and if thou knowest any men of activity among them, then make them rulers over my cattle" (*Gen.* xlvii. 6); and when the murrain came into Egypt it was upon their horses, asses, camels, oxen, and sheep (*Exod.* ix. 3).

The attention and care necessary to be paid to their domestic animals were evidently well known and attended to; for when they proposed to settle in a land, their first thought was to build "sheep-folds for their cattle" (*Numb.* xxxii. 16). They had stalls for their oxen (*Hab.* iii. 17), and for all their beasts. Thus King Hezekiah is said to have made "stalls for all manner of beasts, and cotes for flocks; moreover, he provided him possessions of flocks and herds in abundance" (2 *Chron.* xxxii. 28); and that this abundance exceeded the possessions of the greatest of our modern flock-masters, we may readily ackowledge, when we read that "Mesha, King of Moab, was a sheep-master, and rendered unto the king of Israel 100,000 lambs, and 100,000 rams, with the wool" (2 *Kings* iii. 4).

They prepared the provender for their horses and asses of chaff, or cut straw and barley (*Judges* xix. 21;

1 *Kings* iv. 28). Our translation does not explicitly state this, but it is clear in the Hebrew original (*Dr. Kennicott's* xxiv Codex; *Harmer's Observations*, i. 423). It is also certain, from the Hebrew original, that they tied up calves and bullocks for the purpose of fattening them (*Jerem.* xlvi. 21; *Amos* vi. 4, &c., *Parkhurst's Hebrew Lexicon*, 673); and that they were acquainted with the arts of the dairy. "Surely the churning of milk," says Solomon, "bringeth forth butter" (*Prov.* xxx. 31); and Samuel speaks of the "cheese of kine" (2 *Sam.* xxvii. 29). The chief vegetable products cultivated by these eastern nations, were wheat, barley, beans, lentils, rye, the olive, and the vine. (*Exod.* ix. 31; *Levit.* xix. 10; 2 *Sam.* xvii. 28, &c.)

The scanty notices which we have of their tillage, gives us no reason to doubt that they were skilful husbandmen. Their name for tillage (*Obed*) emphatically expresses their idea of it; for it literally means *to serve the ground* (*Parkhurst*, 508). And that the cares and attention necessary were well sustained, is evidenced by the fact, that David, for his extensive estate, had an overseer for the storehouses in the fields; another over the tillage of the ground; a third over the vineyards; a fourth over the olive trees; two to superintend his herds; a seventh over his camels; an eighth to superintend his flocks; and a ninth to attend similarly to the asses (1 *Chron.* xxvii. 25—31.

Of their ploughing, we know that they turned up the soil in ridges, similarly to our own practice; for the Hebrew name of a husbandman signifies a man who does so (*Parkhurst*, 93). That they ploughed with two beasts of the same species attached abreast to the plough (*Deut.* xxii. 10). That the yoke, or collar, was fastened to the neck of the animal; and that the plough, in its mode of drawing the furrows, resembled our own; for we read of their sharpening the coulter and the ploughshare. (1 *Sam.* xiii. 20, &c.) Ploughing was an operation that they were aware might be beneficially performed at all seasons; for Solomon mentions it as a symptom of a sluggard, that he will not plough in the winter (*Prov.* xx. 4); and that too much care could not be devoted to it, they expressed by deriving their name for ploughing from a Hebrew root, which signifies *silent thought and attention* (*Parkhurst*, 244).

Their sowing was broadcast, from a basket (*Amos* xi. 13; *Psalm* cxxvi. 6); and they gave the land a second superficial ploughing to cover the seed. It is true that harrowing is mentioned in our translation (*Job* xxxix. 10); but Schultens and other Hebraists agree that harrowing was not practiced by them. Russell, in remarking upon the mode of cultivation now practiced near Aleppo, says, "no harrow is used, but the ground is ploughed a second time after it is sown, to cover the grain" (*Parkhurst*, 720).

The after cultivation apparently was not neglected; they had hoes or mattocks which they employed for extirpating injurious plants. "On all hills," says the prophet, "that shall be digged with the mattock, there shall not come thither the fear of briars and thorns (*Isa.* vii. 25). In those hot climates a plentiful supply of moisture was necessary for a healthful vegetation; and the simile of desolation, employed by the same prophet, is "a garden that hath no water" (*Isa.* i. 30). In Egypt they irrigated their lands; and the water thus supplied to them was raised by an Hydraulic machine, worked by men in the same manner as the modern tread-wheel. To this practice Moses alludes, when he reminds the Israelites of their sowing their seed in Egypt, and watering it with their feet, a practice still pursued in Arabia (*Deut.* xi. 10; *Niebuhr, Voyage en Arabie*, i. 121).

When the corn was ripe it was cut with either a sickle or a scythe (*Jer.* l. 16; *Joel* iii. 13), was bound into sheaves (*Psalm* cxxix. 7; *Deut.* xxiv. 19, &c.), and was conveyed in carts (*Amos* ii. 13), either immediately to the threshing floor or to the barn. They never formed it into stacks as we do. These passages in the Scriptures (*Exod.* xxii. 6; *Jud.* xv. 5; *Job* v. 26) refer exclusively to the thraves or shocks in which the sheaves are reared as they are cut. (*Harmer's Observ.* iv. 145, &c.)

The threshing floors, as they are at the present day, were evidently level plats of ground in the open air. (*Jud.* vi. 37; 2 *Sam.* xxiv. 18—25, &c.) They were so placed that the wind might, at the time of the operation, remove the chief part of the chaff. They perhaps had threshing floors under cover, to be used in inclement seasons; for Hosea (ii. 35), speaking of "the *summer* threshing floors," justifies such surmise.

The instruments and modes of threshing were various. They are all mentioned in these two verses of the prophet: "Fitches are not threshed with a threshing instrument, neither is a cart wheel turned upon the cummin, but the fitches are beaten out with a staff, and the cummin with a rod. Bread-corn is bruised because he will not ever be threshing it, nor break it with the wheel of his cart, nor bruise it with his horsemen" (*Isaiah* xxviii. 27, 28).

When the seed was threshed by horses they were ridden by men; and when by cattle, although forbidden to be muzzled (*Deut.* xxv. 4), yet they were evidently taught to perform the labour (*Hosea* x. 11). The "instrument" was a kind of sledge made of thick boards, and furnished underneath with teeth of iron (*Isaiah* xli. 15; *Parkhurst*, 242, 412). The revolving wheels of a cart, and the various sized poles employed for the same purpose, need no further comment.

To complete the dressing of the corn, it was passed through a sieve (*Amos* ix. 9), and thrown up against the wind by means of a shovel. The fan was, and is still, unknown to the eastern husbandmen; and where that word is employed in our translation of the Scriptures, the original seems to intend either the wind or the shovel (*Isa.* xxx. 24; *Jer.* xv. 7; *Parkhurst*, 183, 680).

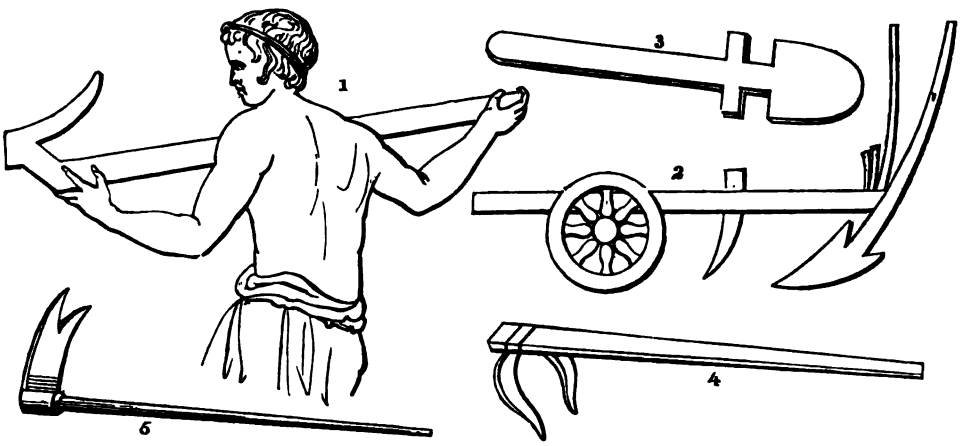
Of their knowledge of manures we know little. Wood was so scarce that they consumed the dung of their animals for fuel (*Parkhurst*, 764). Perhaps it was this deficiency of carbonaceous matters for their lands that makes an attention to fallowing so strictly enjoined. (*Levit.* xix. 23, xxv. 3; *Hosea* x. 12, &c.)

The landed estates were large, both of the kings and of some of their subjects; for we read that Uzziah, king of Judah, "had much both in the low country and in the plains; husbandmen, also, and vine-dressers in the mountains and in Carmel, for he loved husbandry" (2 *Chron.* xxvi. 10); that Elijah found Elisha with

twelve yoke of oxen at plough, himself being with the twelfth yoke (1 *Kings* xix. 19); and that Job, the greatest man of the east, had 14,000 sheep, 6000 camels, 1000 yoke of oxen, and 1000 she-asses (*Job.* l. 3, xlii. 12). In the time of Isaiah, the accumulation of landed property in the hands of a few proprietors was so much on the increase, that a curse was uttered against this engrossment. "Woe unto them," says the prophet, "that join house to house, that lay field to field, till there be no place, that they may be placed alone in the midst of the earth" (*Isaiah* v. 8).

II.

THE AGRICULTURE OF THE GREEKS.



1. Ancient implement, from a tomb-stone at Athens. 2. The Greek plough. 3. The spade. 4, 5 Hoes.

Revelation has taught us to offer up our prayers and thanksgivings for all benefits to the one omni-beneficent Creator and Provider of the universe. The less enlightened ancients, whose religion was mythological, equally convinced with ourselves of the existence of some divine first cause and providence, like us offered up their votive petitions and hymns of praise, though the objects of their worship were as many as the benefits or the evils to which man is subject.

Agriculture was too important and too beneficial an art not to demand, and the Greeks and Romans were nations too polished and discerning not to afford to it, a very plentiful series of presiding deities. They attributed to Ceres, as their progenitors, the Egyptians, did to Isis, the invention of the arts of tilling the soil. Ceres is said to have imparted these to Triptolemus, of Eleusis, and to have sent him as her missionary round the world to teach mankind the best modes of ploughing, sowing, and reaping. In gratitude for this, the Greeks, about 1356 years before the Christian era, established, in honour of Ceres, the Eleusinian mysteries, by far the most celebrated and enduring of all their religious ceremonies; for they were not established at Rome till the close of the fourth century. Superstition is a prolific weakness; and, consequently, by degrees, every operation of agriculture, and every period of the growth of crops, obtained its presiding and tutelary deity. The goddess, *Terra*, was the guardian of the soil; *Stercutius* presided over manures; *Volutia* guarded the crops whilst evolving their leaves; *Flora* received the still more watchful duty of sheltering their blossom; they passed to the guardianship of *Lactantia* when swelling with milky juices; *Rubigo* protected them from blight; and they successively became the care of *Hostilina*, as they shot into ears; of *Matura* as they ripened; and of *Tutelina* when they were reaped. Such creations of Polytheism are fables; but they are errors that should even now give rise to feelings of gratification rather than of contempt. They must please by their elegance; and much more when we reflect that it is the concurrent testimony of anterior nations, through thousands of years, that they detected and acknowledged a Great First Cause.

Unlike the arts of luxury, agriculture has never been subject to any retrograde revolutions; being an occupation necessary for the existence of mankind in any degree of comfort, it has always continued to receive their first attention; and no succeeding age has been more imperfect, but in general more expert, in the art than that which has preceded it. The Greeks are not an exception to this rule; for their agriculture appears to have been much the same in the earliest brief notices we have of them, as it was with the nation of which they were an off-set. The early Grecians, like all new nations, were divided into but two classes: landed proprietors, and *Helots*, or slaves; and the estates of the former were little larger than were sufficient to supply their respective households with necessaries. We read of princes among them; and as we dwell upon the splendid details of the Trojan war, associate with such titles, unreflectingly, all the pageantry and luxury of modern potentates, that are distinguished by similar titles. But in this we are decidedly wrong; for there was probably not a leader of the Greeks who did not, like the father of Ulysses, assist with his own hands in the farming operations. (*Homer's Odyss.* l. xxiv. Hesiod is the earliest writer who gives us any detail of the Grecian agriculture. He appears to have been the contemporary of Homer; and, in that case, to have flourished about nine centuries before the Christian era. His practical statements, however, are very meagre; we have, therefore, preferred taking

Xenophon's Œconomics as our text, and introducing the statements of other authors, as they may occur, to supply deficiencies or to afford illustrations.

Xenophon died at the age of ninety, 359 years before the birth of Christ. The following narrative of the Greek agriculture is from his "Essay," if not otherwise specified.

In Xenophon's time the landed proprietor no longer laboured upon his farm, but had a steward as a general superintendant, and numerous labourers, yet he always advises the master to attend to his own affairs. "My servant," he says, "leads my horse into the fields, and I walk thither for the sake of exercise in a purer air; and when arrived where my workmen are planting trees, tilling the ground, and the like, I observe how everything is performed, and study whether any of these operations may be improved." After his ride his servant took his horse, and led him home, "taking with him," he adds, "to my house, such things as are wanted, and I walk home, wash my hands, and dine off whatever is prepared for me moderately."

"No man," he says, "can be a farmer till he is taught by experience; observation and instruction may do much, but practice teaches many particulars, which no master would ever have thought to remark upon."

"Before we commence the cultivation of a soil," he observes, that "we should notice what crops flourish best upon it; and we may even learn from the weeds it produces what it will best support."

"*Fallowing*, or frequent ploughing in spring or summer," he observes, "is of great advantage;" and Hesiod advises the farmer (*Works and Days*, 50) always to be provided with a spare plough, that no accident may interrupt the operation. The same author directs the ploughman to be very careful in his work. "Let him," he says, "attend to his employment, and trace the furrows carefully in straight lines, not looking around him, having his mind intent upon what he is doing" (*Ibid.* 441—443).

Theophrastus evidently thought that the soil could not be ploughed and stirred about too much, or unseasonably; for the object is to let the earth feel the cold of winter and the sun of summer, to invert the soil, and render it free, light, and clear of all weeds, so that it can most easily afford nourishment (*De Causis Plant.*, lib. iii., cap. 2, 6).

Xenophon recommends green plants to be ploughed in, and even crops to be raised for the purpose; "for such," he says, "enrich the soil as much as dung." He also recommends earth that has been long under water to be put upon land to enrich it, upon a scientific principle which we shall explain under IRRIGATION. Theophrastus, who flourished in the fourth century B. C., is still more particular upon the subject of *manures*. He states his conviction that a proper mixture of soils, as clay with sand, and the contrary, would produce crops as luxuriant as could be effected by the agency of manures. He describes the properties that render dungs beneficial to vegetation, and dwells upon composts (*Hist. of Plants*, ii., cap. 8).

Xenophon recommends the stubble at reaping time to be left long, if the straw is abundant; "and this, if burned, will enrich the soil very much, or it may be cut and mixed with dung."

"The time of *sowing*," says Xenophon, "must be regulated by the season; and it is best to allow seed enough."

Weeds were carefully eradicated from among their crops; "for, besides the hindrance they are to corn, or other profitable plants, they keep the ground from receiving the benefit of a free exposure to the sun and air." Homer describes Laertes as *hoeing*, when found by his son Ulysses (*Odyss.* xxiv. 226).

Water-courses and *ditches* were made to drain away "the wet which is apt to do great damage to corn."

Homer describes the mode of *threshing* corn by the trampling of oxen (*Iliad* xx., lin. 495, &c.); and to get the grain clear from the straw, Xenophon observes, "the men who have the care of the work take care to shake up the straw as they see occasion, flinging into the way of the cattle's feet such corn as they observe to remain in the straw."

From Theophrastus and Xenophon combined, we can also very particularly make out that the Greeks separated the grain from the chaff by throwing it with a shovel against the wind.

III.

THE AGRICULTURE OF THE ROMANS.

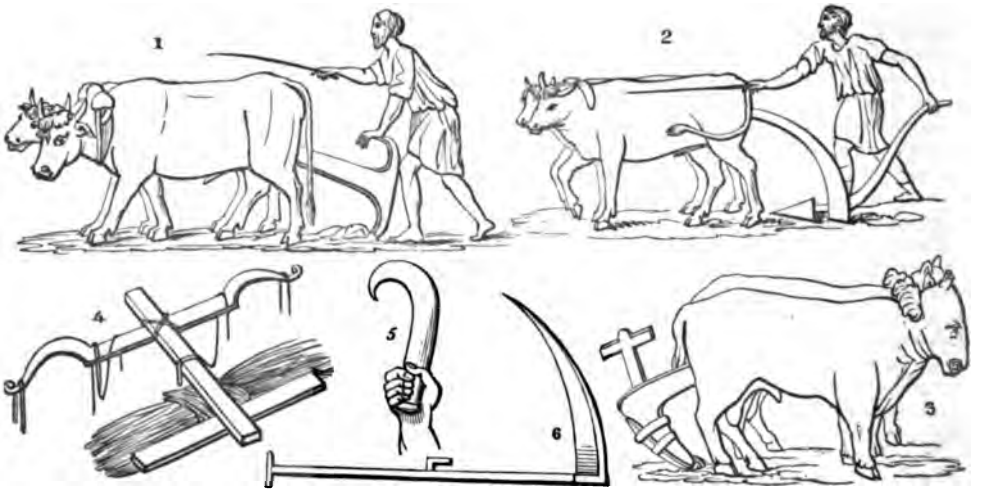
It is certain, that at a very early age Italy received colonies from the Pelasgi and Arcadians; and that, consequently, with them the arts of Greece were introduced; and we may conclude that there was then a similarity in the practice of agriculture in the two countries.

About 753 years before the nativity of Christ, Romulus founded the city of Rome, whose inhabitants were destined to be the conquerors and the improvers of Europe. The Roman eagle was triumphant in Egypt, Persia, Greece, Carthage, and Macedon; and the warriors who bore it on to victory, in those and other countries, being all possessors of land of a larger or smaller extent, naturally introduced, upon their return, any superior vegetable, or improved mode of culture which they observed in those highly civilised seats of their victories.

Thus the arts of Rome arrived at a degree of superiority that was the result of the accumulated improvements of other nations; and, finally, when Rome became in turn the conquered, the victors became acquainted with this accumulated knowledge, and diffused it over the other parts of Europe.

Of the agriculture of the early Romans we know but little; but of its state during the period of their greatest prosperity and improvement, we fortunately have very full information. Cato in the second, and Varro in the first century before the Christian era, Virgil, at the period of that event, Columella and Pliny but few years subsequently, and Palladius in the second or fourth century, each wrote a work upon agriculture, which, with the exception of that by Columella, have come down to us entire.

From these various authorities we derive full information; and we are convinced that many of our readers will be surprised at the correct knowledge of the arts of cultivation possessed by that great nation.



1, 2, 3. Ploughs used by the Romans in different ages. 4. The yoke for fixing the cattle. 5. The reaping-hook. 6. The scythe.

1. *Size of the Roman Farms.*—When Romulus first partitioned the lands of the infant state among his followers, he assigned to no one more than he could cultivate. This was a space of only two acres (*Varro* i. 10; *Pliny*, xvii. 11). After the kings were expelled, seven acres were allotted to each citizen (*Pliny*, xviii. 3). Cincinnatus, Curius Dentatus, Fabricius, Regulus, and others distinguished as the most deserving of the Romans, had no larger estates than this. Cincinnatus, according to some authorities, possessed only four acres. (*Ibid.*; *Columella*, i. 3, &c.) On these limited spaces they dwelt, and cultivated them with their own hands. It was from the plough that Cincinnatus was summoned to be dictator (*Livy*, iii. 26); and the Samnian ambassadors found Curius Dentatus cooking his own repast of vegetables in an earthern vessel. (*Plutarch in vita Cato. Cens.*)

Some of the noblest families in Rome derived their patronymic names from ancestors designated after some vegetable, in the cultivation of which they excelled, as in the examples of the Fabii, Pisones, Lentuli, Cicerones, and the like (*Pliny* xviii. 1). In those days, "when they praised a good man, they called him an agriculturist and a good husbandman; he was thought to be very greatly honoured who was thus praised." (*Cato. in Præf.*) As the limits of the empire extended, and its wealth increased, the estates of the Roman proprietors became very greatly enlarged; and, as we shall see more particularly mentioned in our historical notices of gardening, attained to a value of 80,000*l.* (*Plutarch in vit. Marius et Lucullus.*) Such extensive proprietors let portions of their estates to other citizens, who, if they paid for them a certain rent, like our modern tenants, were called *Coloni* (*Columella*, i. 7; *Pliny Epist.* x. 24) and *Politores*, or *Partiarii*, if they shared the produce in stated proportions with the proprietor. (*Pliny Epist.* vii. 30, and ix. 37, &c.) Leases were occasionally granted, which appear to have been of longer duration than five years (*Ibid.* ix. 37).

2. *Distinction of Soils.*—Soils were characterised by six different qualities, and were described as rich or poor, free or stiff, wet or dry (*Colum.* ii. 2).

The best soil they thought had a blackish colour, was glutinous when wet, and friable when dry; exhaled an agreeable smell when ploughed, imbibed water readily, retaining a sufficiency, and discharging what was superfluous; not injurious to the plough irons by causing a salt rust; frequented by crows and rooks at the time of ploughing; and, when at rest, speedily covered with a rich turf (*Virgil, Georg.* ii. 203, 217, 238, 248; *Pliny*, xvii. 5).

Vines required a light soil, and *corn* a heavy, deep, and rich one. (*Virg. Georg.* ii. 29; *Cato*, vi.)

3. *Manures.*—The dung of animals was particularly esteemed by the Romans for enriching their soil. "Study," says Cato, "to have a large dunghill," (*Cato*, v.) They assiduously collected it and stored it in covered pits, so as to check the escape of the drainage (*Colum.* i. 6; *Pliny* xvii. 9, and xxiv. 19. They sowed pulverised pigeons' dung and the like over their crops, and mixed it with the surface soil by means of the sarcle or hoe (*Colum.* i. 16; *Cato*, xxxvi.) They were aware of the benefit of mixing together earth of opposite qualities (*Ibid.*), and of sowing lupines and ploughing them in while green (*Varro*, i. 23). They burnt the stubble upon the ground, and even collected shrubs and the like for the similar purpose of enriching the soil with their ashes (*Virgil, Geor.* i. 84; *Pliny*, xvii. 6, 25).

Pliny also mentions that lime was employed as a fertilizer in Gaul, and marle in the same country and Britain; but we can only surmise thence that they were also probably employed by the Romans (*Pliny*, xvii. 8, and xvii. 5.)

4. *Draining.*—The superfluous water of soils was carried off by means both of open and covered drains (*Colum.* ii. 2, 8; *Pliny*, xvii. c.; *Virg. G.* i. 109). Cato is very particular in his directions for making them. (*Cato*, xliii. clx.)

5. *Crops.*—They cultivated wheat, spelt, barley, oats, flax, beans, peas, lupines, kidney beans, lentils, tares, sesame, turnips, vines, olives, willows, and the like. To cite the authorities who mention each of these would be needless, for they are noticed in all the Roman writers upon agriculture. Of the relative importance or proportion in which the crops were profitable to the Romans, we have this judgment of Cato: "If you can buy 100 acres of land in a very good situation, the vineyard is the first object if it yields much wine; in the second place a well watered garden; in the third a willow plantation; in the fourth an olive ground; in the fifth a meadow; in the sixth corn ground; in the seventh an underwood; a plantation yielding stout poles for training the vine; and in the ninth a wood where mast grows." (*Cato*, i.)

They made hay, and the process appears to have been the same as in modern times. After being cut it was turned with forks, piled into conical heaps, and finally into stacks or under cover. But the mowing was imperfectly performed; for, as soon as the hay was removed from the field, the mowers had to go over it again (*Varro; Colum.* ii. 22).

6. *Implements.*—The plough consisted of several parts: the beam to which the yoke of the oxen was fastened; the tail or handle terminated in a cross bar, with which the ploughman guided the instrument; it had a plough-share, the share-beam to which it was fixed, and two mould-boards, a coulter, and a plough-staff for cleaning the plough-share (*Ovid. Pont.* i. 8, 57; *Virg. G.* i. 170; *Pliny*, xvii. 18, 19). Some of their ploughs had wheels, and some were without coulters and earth-boards. Besides this, they had spades, rakes, hoes, with plain and with forked blades, harrows, mattocks, and similar implements.

7. *Operations.*—PLOUGHING was usually performed by two oxen, though three were sometimes employed. They were yoked abreast, and trained when young to the employment. (*Cicero, in Verr.* iii. 21; *Col.* vi. 2, 10; *Pliny*, xviii. 18; *Virg. G.* iii. 163, &c.) They were usually yoked by the neck, but sometimes by the horns (*Pliny*, viii. 45; *Colum.* ii. 2). There was but one man to a plough, which he guided, and managed the oxen with a goad (*Pliny, Epist.* viii. 17).

They sometimes ploughed in ridges, and sometimes not. They did not take a circuit when they came to the end of the field, as is our practice, but returned close to the furrow. They were very particular in drawing straight and equal sized furrows (*Pliny*, xviii. 19, s. 49).

They seem to have ploughed three times always before they sowed (*Varro*, i. 29): and to stiff soils, even as many as nine ploughings were given (*Virg. G.* i. 47; *Pliny*, xviii. 20; *Pliny, Epist.* v. 6). The furrows in the first ploughing were usually nine inches deep. When the soil was only stirred about three inches, it was called *scarification* (*Pliny*, xviii. 17—19). They usually fallowed their land every other year (*Virg. G.* i. 71).

SOWING was performed by hand, from a basket; and that it might be performed regularly, the hand moved with the steps (*Colum.* ii. 9; *Pliny*, xviii. 24). The seed was either scattered upon the land and covered by means of rakes and harrows, or more commonly by sowing it upon a plain surface, and covering by a shallow ploughing, which caused it to come up in rows, and facilitated the operation of hoeing (*Pliny*, xviii. 20). They were particular as to the time of sowing, the choice of seeds, and the quantity sown. (*Varro*, i. 44; *Pliny*, xviii. 24, s. 55; *Virg, G.* i. 193, &c.)

WEEDING was performed by hoes, hooks, and by hand.

In dry seasons the crops were watered (*Virg. G.* i. 106). If they appeared too luxuriant they were fed off (*Ibid.* 193).

REAPING and MOWING were the usual modes of cutting down the corn crops, but the ears were sometimes taken off by a toothed machine, called *Batilium*, which seems to have been a wheeled cart, pushed by oxen through the corn, and catching the ears of corn between a row of teeth fixed to it, upon the principle of the modern daisy rake. In Gaul, the corn was cut down by a machine drawn by two horses (*Varro*, i. 50; *Virg. G.* i. 317; *Colum.* ii. 21; *Pliny*, xviii. 30). They do not seem to have ever bound their corn into sheaves (*Colum.* ii. 21).

THRESHING was performed by the trampling of oxen and horses, by flails, and by means of sledges drawn over the corn (*Pliny*, xvii. 30; *Colum.* ii. 21; *Virg. G.* iii. 132; *Tibullus*, i. 5, 22; *Varro*, i. 52). The threshing floor was circular, placed near the house, on high ground, and exposed on all sides to the winds. It was highest in the centre, and paved with stones, or more usually with clay, mixed with the lees of the oil, and very carefully consolidated. (*Colum.* i. 6; *Varro*, i. 2; *Virg. G.* i. 178; *Cato*, xci. and cxxix.)

DRESSING was performed by means of a sieve or van, and by a shovel, with which it was thrown up and exposed to the wind (*Varro*, i. 52; *Colum.* ii. 21). It was finally stored in granaries or in pits, where it would keep fifty years (*Pliny*, xviii. 30; *Varro*, i. 57).

8. *Animals.*—Oxen, horses, asses, mules, sheep, goats, swine, hens, pigeons, pea-fowls, pheasants, geese, ducks, swans, guinea-fowls, and bees, are mentioned by various authors as products of the Roman farms. Directions for breeding many of these are given in the third and fourth books of the Georgics.

Such is an outline of the Roman agriculture; and in it our readers will doubtless find sufficient evidence to warrant them in agreeing with us, that it was but little different from that pursued by the present farmers of England. We are superior to them in our implements, and consequently in the facility of performing the operations of tillage; we perhaps have superior varieties of corn, but we most excel them in our rotation of crops, and in the management of stock. We differ from them, also, in not practising the superstitious rites and sacrifices which accompanied almost all their operations (See *Cato*, cxxxiv. c.); but of the fundamental practices of agriculture they were as fully aware as ourselves. No modern writer could lay down more correct and comprehensive axioms than Cato did in the following words; and whoever strictly obeys them will never be ranked among the ignorant of the art. "What is good tillage?" says this oldest of the Roman teachers of agriculture; "to plough. What is the second? to plough. The third is to manure. The other part of

tillage is to sow plentifully, to choose your seed cautiously, and to remove as many weeds as possible in the season." (*Cato*, lxi.)

Such is an epitome of their agricultural knowledge; a knowledge which has since increased, and can only in future be added to by attending to this advice of another of their writers. "Nature," he observes, "has shown to us two paths which lead to a knowledge of agriculture—experience and imitation. Preceding husbandmen, by making experiments, have established many maxims; their posterity generally imitate them; but we ought not only to imitate others, but make experiments, not directed by chance, but by reason" (*Varro*, i. 18).

IV.

THE AGRICULTURE OF ENGLAND.

The historian of English agriculture has not the least trace of authority from which he can obtain information of its state beyond the period when the Romans invaded this island, and the annals of even that period are meagre and unsatisfactory.

When Cæsar arrived in England, about 55 B.C., he describes the Cantii, or inhabitants of Kent, and the Belgæ, inhabiting the modern counties of Somerset, Wilts, and Hants, as much more advanced than the rest of the people in the habits of civilized life. They cultivated the soil; employed marl as manure; stored their corn unthreshed, and freed it from the chaff and bran only as their daily demands required. The interior inhabitants lived chiefly upon milk and flesh, being fed and clothed by the produce of their herds. "The country," adds Cæsar, "is well-peopled, and abounds in buildings resembling those of the Gauls, and they have a great abundance of cattle. They are not allowed to eat either the hen, the goose, or the hare, yet they take pleasure in breeding them." (*Cæs.* v. cap. 10; *Strabo*, iv. 305; *Diodor. Sic.* v. 301; *Pliny*, xvii. 4.) Cicero, in one of his letters, says, "There is not a scruple of money in the island; nor any hopes of booty, but in slaves;" (*Lib.* iv. *Ep.* 17); a description, that the industry and intelligence of succeeding ages has rendered singularly inapplicable. The first steps in that improvement were owing to the Romans themselves. Rutilius has elegantly and correctly said, that Rome filled the world with her legislative triumphs, and caused all to live in one common union, blending discordant nations into one country, and, by imparting a companionship in her own acquirements and laws, formed one great city of the world.

Agricola was the chief instrument in imparting to the Britons the improved arts and civilization of the Romans. "To wean them from their savage habits, Agricola held forth the baits of pleasure, encouraging the natives, as well by public assistance as by warm exhortations, to build temples, courts of justice, and commodious dwelling-houses. He bestowed encomiums on such as cheerfully obeyed; the slow and uncomplying were branded with reproach: and thus a spirit of emulation diffused itself, operating like a sense of duty. To establish a plan of education, and give the sons of the leading chiefs a tincture of letters, was part of his policy. By way of encouragement he praised their talents, and already saw them, by the force of their natural genius, rising superior to the attainments of the Gauls. The consequence was, that they who had always disdained the Roman language began to cultivate its beauties. The Roman apparel was seen without prejudice, and the toga became a fashionable part of dress. By degrees the charms of vice gained admission to their hearts; baths, porticos, and elegant banquets grew into vogue; and the new manners, which in fact served only to sweeten slavery, were by the unsuspecting Britons called the arts of polished humanity." (*Tacitus, Agricola*, xxi). Thus eloquently does Tacitus describe the diffusion of the Roman arts among the early natives of our country; and that agriculture was one of those in which they so rapidly improved, is attested by the fact, that in the fourth century the Emperor Julian, having erected here granaries in which to store the tributary corn that he exacted from the natives, at one time sent a fleet of 600 large vessels, to convey away the store they contained. Julian himself particularizes the transaction. "If," says Gibbon, "we compute those vessels at only seventy tons each, they were capable of exporting 120,000 quarters: and the country which could bear so large an exportation must have attained an improved state of agriculture." (*Dec. and Fall of Rom. Emp.* cap. xix).

Possessing this improved agriculture, our country was successively subdued by the Saxons, the Danes, and the Normans; but as these all came to improve their fortunes, and to win the comforts of life, agriculture continued to flourish; her operations were interrupted, her products destroyed, in whichever direction swept the tide of war, —but no sooner was peace restored than the inhabitants, though of varied extraction, united their knowledge in the pursuit of this art, on which not only their comfort but their existence so chiefly depended. A similar summary observation applies to all succeeding ages; and our agriculture has continued slowly to improve, in spite of every obstacle that has occasionally delayed, or that has permanently retarded its advance.

1. *Tenures—Size of Estates.*—The native Britons, it is very certain, appropriated but small portions of the land for raising corn, or other cultivated vegetables, and the rest of the country was left entirely open, affording a common pasturage for their cattle, and pannage for their swine. Under the Roman government, we have seen that the extent of cultivated ground must have considerably increased, yet the oldest writers agree, that by far the greatest proportion of the country was occupied by heaths, woods, and other unreclaimed wastes.

When the Saxons established themselves in the island, an almost total revolution in the proprietorship of the lands must have occurred. The conquest was only accomplished after a bloody struggle; and what was won by the sword was considered to possess an equitable title, that the sword alone could disturb. In those days it was considered that the lands of a country all belonged to the king; and on this principle the Saxon monarchs gave to their followers whatever districts they pleased, as rewards for the assistance afforded in the conquest, reserving

to themselves certain portions, and imposing certain burdens upon each estate granted. (*Coke's Littleton*, 1, 58, 2; *Blackstone's Comm.*, 45, &c.) This was only a continuance of that feudal system that prevailed upon the continent; and we may take the county of Sussex as an example, how the land was carved out among the aristocracy, reckoning a *hide* at 100 or 150 acres.

	Hides.		Hides.		Hides.
The King had	59½	Bishop Osborn	149	William of Braiose . .	452¼
Archbishop of Canterbury .	214	Abbot of St. Peters, Winchester	33	Abbot of St. Edward . . .	21
Bishop of Chichester . . .	184	Church of Battle	60½	Comes Moriton . . .	520
Abbot of Westminster . .	7	Comes of Oro	196¼	William of Warrene . . .	620¼
Abbot of Fescamp	135	Comes Roger	818	Odo and Eldred . . .	10

These great proprietors granted the chief part of their estates to the actual cultivators of the soil, receiving in general from the under-tenants certain proportions of whatever might be the productions of the farms. Thus we find one tenant stating, "I give food for seventy swine in that woody allotment, called Wulfeudinleh, and five waggons full of good twigs, and every year an oak for building, and others for necessary fires, and sufficient wood for burning" (*Bede, Hist. Append.*, 970). The rent of ten hides of land were even regulated by two of the laws of King Ina. They enacted that the tenant of such extent of land should render to the lord ten vessels of honey, three hundred loaves, twelve casks of Welsh ale, thirty of clear ale, two old rams, ten wethers, ten geese, twenty hens, ten cheeses, one cask of butter, five salmon, twenty pounds weight of fodder, and one hundred eels; or else ten mittas of malt, five of grits, ten of wheat flour, eight gammons, sixteen cheeses, two fat crows, and in Lent eight salmon (*Wilkins, Leges Saxon.* 25, 3; *Gale's Hist. R.* 410). Such grants were usually to the tenant and his heirs for ever, so long as they afforded the accustomed rent; and we are not aware of any grant or lease extending for a shorter period than the life of the tenant. An example of these occurs in the year 852, when the abbot and monks of Medehamsted let some land at Sempingham, to a tenant named Wulfred, for his life, on condition that he annually paid them sixty fother of wood, twelve fother of *græfan* (coals), six fother of turf, two tons of clear ale, two killed oxen, six hundred loaves, ten casks of Welsh ale, one horse, thirty shillings, and a night's lodging (*Saxon Chronicle*, 75).

As this feudal system declined, and was finally extinguished in the twelfth year of Charles the Second, so proportionately did the landed interest increase in prosperity. Freed from the burthen of furnishing a soldier and his armour for every certain number of acres, and all restrictions as to land changing hands being removed, and the numerous impositions being got rid of, with which the lords oppressed their sub-infeudatories, it soon became a marketable species of property; and, as money and merchandise increased, and the proprietor lived less upon his estate, it soon became the most eligible plan for both landlord and tenant, that the whole rent should be paid in money.

Of the size of these early farms we have no precise information; but, from the laws of Ina we may perhaps conclude that a hide of land, equal to about 100 or 120 acres, was the customary size; for, in speaking of the produce to be given to the lord for ten hides, the law speaks of the smallest division of each county of which it was particularly cognizant; namely, of ten families, or *a tithing* as they were collectively called. Again, Bede expressly calls a hide of land *familia*, and says it was sufficient to support a family. It was otherwise called *mansum*, or *manerium*, and was considered to be so much as one could cultivate in a year (*Henry of Huntingdon*, vi. 2066). That the boundaries of these farms, or manentes, were well defined is certain; for we have many grants in which they are detailed. The following is one of the shortest; it bears the date of 866. "From Sture, on the Honey-brook, up behind the brook on the old hedge; along the hedge on the old way; along the way on the great street; along the street on four boundaries; then so to Calcbrook, along the brook; then so to Horsebrook, along the brook; then so to the ditch, along the ditch to the store again; on the store to the ditch that is called Thredestreo, along the ditch to the Heasecan-hill; from that hill to the ditch; along the ditch to Wenforth, along Wenforth, and then again to the Sture" (*Smith's Append. to Bede*, 770).

War succeeded war, and chivalry and the chace were the engrossing occupations of the landed proprietors during the whole of the middle ages; yet amid all these convulsions, and all this neglect, agriculture continued to obtain a similar degree of attention, and its practitioners to occupy a similarly humble, yet more independant station of life. Bishop Latimer flourished in the first half of the sixteenth century; and his father was among the most respectable yeomen of his time, yet his farm evidently did not exceed 100 acres. "My father," says Latimer, "was a yeoman, and had no lands of his own; he had only a farm of three or four pounds by the year, at the utmost; and hereupon he tilled as much as kept half a dozen men. He had a walk for 100 sheep; and my mother milked thirty kine," &c. (*Latimer's Sermons*, p. 30) But that this class of society was then not very refined, is proved by Sir A. Fitzherbert, in his *Book of Husbandry*, first published in 1532, declaring, "It is the wife's occupation to winnow all manner of corn, to make malt, to wash and wring, to make hay, to shear corn, and in time of need to help her husband to fill the muckwain, or dung-cart; to drive the plough, to load corn, hay and such other; and to go or ride to the market, to sell butter, cheese, milk, eggs, chickens, capons, hens, pigs, geese, and all manner of corn."

This race of farmers, and this extent of farm, continued much the same till the closing years of the eighteenth century. The wife, indeed, had long previously ceased to participate in the above-mentioned drudgery, but she still attended the dairy, and sold its products at market, as her husband still participated in the usual labours of his farm; but in the latter half of that century, and thence to the present time, a different class of men have engaged in the cultivation of the soil. The accumulation of wealth from the vast increase and improvement of our manufactures and commerce, the diffusion of better information, and the increased population, have all contributed to this effect. Individuals engage in the pursuit whose education and habits require a larger income

for their indulgence than can be afforded by the profits of a small farm; and, consequently, in districts having the most fertile soils, farms of from 300 to 500 acres are very common; whilst in less productive districts they extend even to 1000 and 2000 acres. With the present expenditure of rent, tithe, taxes, rates, and labour, and the reduced prices of agricultural produce, farms, even of those extents, cannot yield a profit sufficient to support the farmer of refined habits. And if the present artificial system of corn laws is removed, we do not see any possible result but a return to smaller farms, and a more labouring class of tenants; for it admits of perfect demonstration, that small farms, having that manual labour, and that careful tillage which small plots obtain, return a more abundant produce than those which are too large to be so attentively cultivated.

Inclosure of Land.—It is a rule, founded upon general observation, that the most enclosed country is always the best cultivated: for, as Sir Anthony Fitzherbert observed, in the reign of Henry the Eighth, live stock may be better kept, and with less attendance, closes be better alternately cropped, and the crops better sheltered in inclement seasons, "if an acre of land," he concludes, "be worth sixpence an acre before it is inclosed."

We have seen, in a previous page, that hedges, ditches, and other fences, marked the boundaries of the early Saxon estates; and these were certainly not adventitious distinctions, for they are mentioned in most of the Saxon grants of which we are aware, and are strictly regulated and protected by law. If a tenant omitted to keep his farm inclosed, both in winter and summer, and to keep his gate closed, if any damage arose from his hedge being broken down or his gate being open, he was declared to be legally punishable (*Wilkins, Leges Sax.*, 21). If a freeman broke through another's hedge he was fined 6*s*. (*Ibid.*)

As our woollen manufactures improved, the demand for our broad cloths became excessive, not only in our own but in the continental nations; and the consequent consumption of wool was so large, and the price was so enhanced, that self-interest dictated to the landed proprietors, even in the reign of Henry the Third, that the inclosure of their manorial wastes, on which to feed sheep upon their own account, or to let out as pasture farms, would be a source of extensive emolument. The statutes of 20 Henry the Third, 13 Edward the First, and others, were consequently passed for sanctioning and regulating the practice. The demand for woollens continued, and became so great, that rapidity of manufacture was the chief consideration. "Yet as ill as they be made," says King Edward the Sixth, in his private journal, "the Flemings do at this time, desire them wonderfully." The consequences are depicted by the same genuine authority. "The artificer will leave the town, and for his mere pastime will live in the country; yea, more than that, will be a justice of the peace, and will scorn to have it denied him, so lordly be they now-a-days; for they are not content with 2000 sheep, but they must have 20,000, or else they think themselves not well. They must have twenty miles square their own land, or full of their farms: four or five crafts to live by is too little. Such hell-hounds be they" (*Edward the Sixth's Remains*, p. 101). The rents of land were consequently enormously raised, and the corn farmers were ruined. "They everywhere," says Roger Ascham, "labour, economise, and consume themselves to satisfy their owners. Hence so many families dispersed, so many houses ruined, so many tables common to every one, taken away. Hence the honour and strength of England, the noble yeomanry, are broken up and destroyed" (*Ascham's Epistles*, 293—95). Bishops Scory, Latimer, and others, raised their voices in their behalf, and hurled their invectives from the pulpit upon those who oppressed them. "Let them," said Latimer, in a sermon preached before the king, "Let them have sufficient to maintain them, and to find them in necessaries. A plough land must have sheep to dung their ground for bearing corn; they must have swine for their food, to make their bacon of; their bacon is their venison, it is their necessary food to feed on, which they may not lack; they must have other cattle, as horses to draw their plough and for carriage of things to the markets, and kine for their milk and cheese, which they must live upon, and pay their rents."

The short-sighted executive of that period endeavoured to prevent these inclosures by a prohibitory proclamation, as the legislature had done by the statutes 4th of Henry the Seventh, c. 16, 19. There doubtless was great distress, and always will be upon any sudden change in the direction of the national industry, and in none more extensively than in the return from an agricultural to a pastoral mode of life. But, as is observed by one of the most impartial of our historians, "every one has a legal and social right of employing his property as he pleases; and how far he will make his use of it compatible with the comforts of others, must be always a matter of his private consideration, with which no one, without infringing the common freedom of all, can ever interfere. That no national detriment resulted from this extensive inclosure—no diminution of the riches, food, and prosperity of the country at large, is clear to every one who surveys the general state and progress of England with a comprehensive impartiality." (*Turner's History of Edward the Sixth*, &c.) "The landlord," he further observes, "advanced his rent, but the farmer also was demanding more for his produce."

The evil of converting arable to pasture land cured itself. The increased growth of wool in other countries, and the improvement of their manufactures, by degrees caused the production of it in England to diminish; and as dearths of corn accrued, and the consequent enormous increase of its value rendered its growth more lucrative, pasture land gradually returned to the dominion of the plough.

Since that period inclosures have gone on since with various, but certainly undiminished, degrees of activity. More than 3000 inclosure bills were passed in the reign of George the Third. The land so inclosed was, and is, chiefly dedicated to the growth of corn; but since the field culture of turnips was introduced in the seventeenth, of mangel wurzel in the nineteenth century, and other improvements in our agricultural practice, every farm is enabled to combine the advantages of the stock and tillage husbandry.

Implements.—It is very certain that the state of any art is intimately connected with that of its instruments. If these are imperfect it cannot be much advanced; and this is so universally the case, that agriculture of course is no exception.

We find, in the earliest of our national records, that the *plough*, the most important implement of husbandmen,

was then of a very rude construction. In general form it rudely resembled the plough now employed, but the workmanship was singularly imperfect. This is no matter of surprise; for among the early inhabitants of this country there were no artificers. The ploughman was also the ploughwright. It was a law of the early Britons that no one should guide a plough until he could make one; and that the driver should make the traces, by which it was drawn, of withs or twisted willow, a circumstance which affords an interpretation to many corrupt terms at present used by farming men to distinguish the parts of the cart harness. Thus the *womb withy* has degenerated into *wambtye* or *wantye*; *withen trees* into *whipping* or *whipple trees*; besides which we have the *tail withes*, and some others still uncorrupted (*Leges Wallicæ*, 283—8. We read, also, that Easterwin, Abbot of Wearmouth, not only guided the plough and winnowed the corn grown on the abbey lands, but also with his hammer forged the instruments of husbandry upon the anvil (*Bede, Hist. Abb. Weremoth*, 296). Whether the early British or Saxon ploughs had wheels is uncertain, but those of the Normans certainly had such appendages. Pliny says that wheels were first applied to ploughs by the Gauls. The Britons were forbidden to plough with any other animal than the ox; and they attached any requisite number of oxen to the plough. The Normans had been accustomed, in their light soils, to employ only one, or at most two (*Leges Wallicæ*, 288; *Montfaucon's Monumens de Monarchie François*, I. *Planche* 47; *Giraldus Cambrensis*, c. 17).

1. Norman plough, with the hatchet carried by the ploughman for breaking the clods. 2. Sowing, as represented by Strutt. 3. Reaping. 4. Threshing. 5. Whetting. 6. Beating hemp.

The gigantic and universal impulse that seemed simultaneously to affect the human mind in the sixteenth century, tended to the improvement of sciences which could not be benefited without agriculture sharing in the good. Metallurgy and its subservient arts, and applied mathematics, were thus assistant to improving the plough. It received the first improvement among the Dutch and Flemings in the sixteenth century; and still more so in Scotland in the following one.

The common wooden swing plough is the state to which it was brought in the last named country in the eighteenth century, and still is known in many countries, as the *improved Scotch plough*. The first author of the improved form is differently stated. A man of the name of Lummis has by one writer this credit assigned to him, though he learned the improvement in Holland. He obtained a patent for his form of construction; but another ploughman, named Pashley, living at Kirkleathem, pirated his invention. The son of Lummis established a manufactory at Rotheram in Gloucestershire, whence it is sometimes called the *Rotheram* plough; but in Scotland it was known as the *Dutch* or *Patent Plough*. On the other hand, the Rotheram plough is said to have been made at that town in 1720, or ten years before Lummis's improvements. The grandmother of the Earl Buchan, Lady Stewart of Goodtrees, near Edinburgh, is also named as an improver. She invented the *Rutherglen* plough, formerly much employed in the west of Scotland. Mr. Small, in 1784, and Mr. Bailey, in 1795, published upon the proper mathematical form of this implement. In the fourth volume of the *Transactions of the Highland Society*, and in the *Quarterly Journal of Agriculture* for February 1829, there are also two valuable Essays upon the same subject. In 1811 this plough came very generally to be made of cast iron. (*Amos's Essay on Agricultural Machines, Survey of W. Riding of Yorkshire*, &c.)

Wheel Ploughs have been commensurately improved. The objects to be attended to in the formation of a plough, and that is the best which attains to them most effectually, are, first, that it shall enter and pass through the soil with the least possible resistance; secondly, that the furrow slice be accurately turned over; and thirdly, that the moving power or team shall be placed in the most beneficial line of draught.

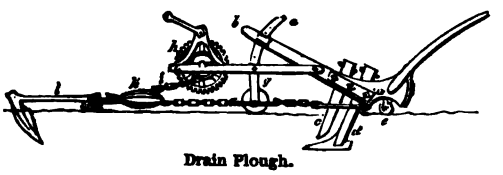
Scarifiers and Horse Hoes are implements which were unknown till within about a century ago. Hoeing by manual labour had, in very early ages, been partially practiced, for the earliest writers we have seen recommended particular attention to the cutting down and destroying of weeds. But to our countryman, Jethro Tull, is indisputably due the honour of having first demonstrated the importance of frequent hoeing, not merely to

extirpate weeds, but for the purpose of pulverizing the soil, by which process the gases and moisture of the atmosphere are enabled more freely to penetrate to the roots of the crop. The works of Tull appeared between the years 1731 and 1739.

DRILLS. We noticed, when considering the Roman agriculture, that the Romans endeavoured to attain the advantages incident to row-culture by ploughing in their seeds. A rude machine is described in the *Transactions of the Board of Agriculture*, as having been used immemorially in India for sowing in rows. The first drill for this purpose introduced into Europe, seems to have been the invention of a German, who made it known to the Spanish Court in 1647 (*Harte's Essays on Husbandry*). It was first brought much into notice in this country by Tull, in 1731; but the practice did not come into any thing like general adoption till the commencement of the present century. There are now several improved machines adapted to the sowing of corn, beans, and turnips.

DRAINING, as we have seen, was attended to by the Romans, and it was unquestionably practiced in Britain during the middle ages; for where lands were too retentive of moisture, or abounded in springs, the obvious remedy was to remove it by drains. This, however, and far simpler operations, are seldom performed in the most correct mode without a knowledge of the sciences connected with their success. Draining was never correctly understood till the scientific observations of Dr. Anderson, and the practical details of Mr. Elkington, about the year 1761, placed it upon a more enlightened and correct system. The important benefits that have arisen from the adoption of this system are very extensive; and the acknowledgment of £1000, voted to Mr. Elkington, was a just testimony that the landed interest appreciated the boon, and that the benefiter of this country is duly estimated by its legislature.

There are numerous kinds of DRAIN PLOUGHS. The *Mole* Plough was invented by a Mr. Adam Scott, and improved by a Mr. Lumley of Gloucestershire during the present century.



Drain Plough.

The past and the present century have also given birth to machines totally unknown in previous ages; of these are rollers, machines for haymaking, reaping, threshing, and dressing; and if to these be added the immense improvement that has taken place in the form and quality of all other agricultural implements, the saving of labour, and the power to pursue the necessary operations neatly and well, will be found to be incalculably promoted.

Crops.—It is probable that WHEAT was not cultivated by the early Britons, for the climate, owing to the immense preponderance of woods and undrained soil, was so severe and wet, that in winter they could attempt no agricultural employments; and even when Bede wrote, early in the eighth century, the Anglo-Saxons sowed their wheat in spring (*Bede's Works*, 244). The quantity cultivated in the reign of Henry the Third does not appear to have exceeded the quantity necessary for the year's consumption; for in a very wet, inclement year, 1270, wheat sold for six pounds eight shillings per quarter, which, calculating for the difference of the value of money, was equal to twenty-five pounds of our present currency. It continued an article of comparative luxury till nearly the 17th century commenced; for in the household books of several noble families it is mentioned that *manchets*, and other loaves of wheat flour, were served at the master's table, but there is only notice taken of coarser kinds for the servants. That the cultivation of wheat was very partial in the reign of Elizabeth is attested by Tusser, who, writing at that period, says,

> " In Suffolk again, whereas wheat never grew,
> Good husbandry used, good wheat-land I knew."

As our climate has improved by the clearing and drying of the surface of the country, so, proportionately, has the cultivation of wheat extended.

It was probably owing to our fickle and inclement climate rendering the successful completion of harvest a much rarer, and more hazardous event than now, that our forefathers made on the occasion such marked and joyous festivities. We do not know the motive that actuated the farmer, but no dread of an uncertain harvest could have made him more prompt and vigorous, who, in 1389, cut and stored two hundred acres of corn in two days. The account is given in " The History of Hewstead." About two hundred and fifty reapers, thatchers, and others, were employed during one day, and more than two hundred the next. The expenses of the lord on this occasion are thus stated:—nineteen reapers, hired for a day at their own board, 4*d.* each; eighty men one day, and kept at the lady's board, 4*d.* each; one hundred and forty men, hired for one day, at 3*d.* each; wages of the head reaper, 6*s.* 8*d.*; of the brewer, 3*s.* 4*d.*; of the cook, 3*s.* 4*d.*; thirty acres of oats, tied up by the job, 1*s.* 8*d.*; three acres of wheat, cut and tied up by the job, 1*s.* 11*d.*; five pair of gloves, &c."

BARLEY is probably the grain which was most cultivated by the early Britons. The representation of it occurs upon their coins (*Camden's Britannia, by Gibson*, lxxviii.). It was not only the grain from which their progenitors, the Cymri, made their bread, but from which they made their favourite beverage, *beer*.

OATS being well known and cultivated by the Germans and other continental nations when Pliny wrote, they were probably known also to this island in the earliest ages. In all periods, even to the present time, bread made of oatmeal has been a very prominent part of the food of the inhabitants of the northern parts of Britain. " In Lancashire," says Gerarde in 1597, " it is their chiefest bread-corn, for jamrocks, haver-cakes, thorffe-cakes, and those which are called generally oaten cakes; and for the most part they call the grain *haver*, whereof they do likewise make drink for want of barley." It is so hardy that it is admirably calculated for a cold climate, and there is scarcely any soil in which it will not be productive. In southern climates it will not flourish.

"RYE," says Gerarde, "groweth very plentifully in the most parts of Germany and Polonia, as appeareth by the great quantity brought into England in times of scarcity of corn, as happened in the year 1596; and at other times, when there was a general want of bread corn, by reason of the abundance of rain that fell the year before, whereby great penury ensued, as well of cattle, and all other victuals, as of all manner of grain. It groweth, likewise, very well in most places of England, especially towards the north."

Its hardiness probably rendered it a principal grain with the early Britons; but as it is a great impoverisher of the soil upon which it grows, and the grain makes very inferior bread, it is now cultivated to a very small extent.

PEAS have been extensively cultivated in this country from a very early period; but they have been much less since the BEAN has become a more general field crop, which it did not till within the present century. *Lentils* were brought to England about 1548. Gerarde says he had heard they were cultivated as fodder near Watford. *Maize*, or *Indian corn*, was made known in England in 1562. It is commonly cultivated in the south of France as a field crop, and for the same purpose was tried in this country in 1828, at the recommendation of Mr. Cobbett, but it has not succeeded. *Tares*, in 1566, according to Ray, were grown as a seed crop, and given to horses, mixed with oats and peas, though they were sometimes cut green as fodder. This is now their chief use.

POTATOES were introduced from South America by Sir Walter Raleigh, about 1586. Sir Robert Southwell, President of the Royal Society, informed the Fellows in 1693, that his father introduced them into Ireland, having received them from Sir Walter (*MS. Journal of Royal Society*). It long continued to be neglected by gardeners. In 1663, however, attention was drawn to its extensive culture. But notwithstanding the exertions of the Royal Society to effect this purpose, potatoes did not become a field crop till the early part of the last century. They became so in Scotland about 1730, a day labourer of the name of Prentice having the honour of first cultivating them largely two years previously. Every county of England now grows them extensively. Lancashire and Cheshire are particularly celebrated for them. In the counties round London, especially in Essex, about two thousand acres are annually cultivated for supplying the metropolis with this root.

TURNIPS and CLOVER, though known in this country during time immemorial, were never much cultivated in the field before the early part of the seventeenth century, and we mention them together because their introduction among the farmer's crops caused the greatest improvement in the art that it ever received. In 1684, it is observed as a modern discovery, "sheep fatten very well on turnips, these proving an excellent nourishment for them in hard winters, when fodder is scarce; for they will not only eat the greens, but feed on the roots in the ground, scooping them out even to the very skin." This is the first notice we have of feeding off turnips; and the same authority adds, "ten acres sown with clover, turnips, &c. will feed as many sheep as one hundred acres would have done before" (*Houghton's Collections on Husbandry, &c.* iv. 142—44). Brown, Donaldson, and all other writers upon agriculture agree, that the introduction of the improved mode of cultivating these crops revolutionised the art of husbandry. Previously, light soils could not be cropped with advantage; there was no rotation that the judgment could approve. Tusser, in the sixteenth century, in the following homely lines, tells us that two corn crops were grown consecutively and then a fallow; and many authorities could be quoted to shew that some soils were fallowed on alternate years, so that they afforded only one crop in two years.

> "First rie and then barlie, the champion saies,
> Or wheat before barlie, be champion waies:
> But drink before bread-corn, with Middlesex men,
> Then laie on more compas, and fallow agen."

But now, by the aid of green crops, a fallow usually occurs but once in four years. "Clover and turnips," it has been observed, "are the two main pillars of the best courses of British husbandry; they have contributed more to preserve and augment the fertility of the soil for producing grain, to enlarge and improve our breeds of cattle and sheep, and to afford a regular supply of butcher's meat all the year, than any other crops." It was previously a difficult task to support live stock through the winter and spring months; and as for feeding and preparing cattle and sheep for market during these inclement seasons, the practice was hardly thought of, and still more rarely attempted.

MANGOLD WURZEL has only been cultivated by the farmer for a few years past. Its chief advantage is, that as it will succeed upon tenacious soils which will not produce turnips, it enables farms in which such soils predominate, to support a larger quantity of live stock. Its cultivation seems on the increase, its fattening qualities being good, the produce heavy, and liability to failure small.

HOPS, although indigenous to this country, were little attended to, and never employed in brewing till the sixteenth century; and then, when they began to be more used, the citizens of London petitioned parliament to prevent them as a nuisance. "It is not many years since," says Walter Blith, writing in the year 1653, "the famous City of London petitioned against two nuisances, and these were Newcastle coals, in regard of their stench, &c., and hops, in regard they would spoil the taste of drink and endanger the people" (*English Improver Improved*, 3rd Ed. 240).

There are many other crops occasionally cultivated by the farmer which may be enumerated here, and most of them first extensively cultivated within the last hundred and fifty years, but which in this place will require no further notice—such as the artificial grasses, rape, mustard, caraway, coriander, flax, hemp, buck wheat or brank, teasel, madder, saintfoin, lucerne, cabbage, carrots, and others.

General Cultivation.—We have no information as to whether the early inhabitants of Britain varied their modes of *ploughing* with the nature of their soil. They sometimes ploughed with two oxen, sometimes with more; some ploughmen, represented in very old pictures, evidently drove the team as well as guided the plough; but it was usual for them to have a driver. There is a very old Saxon dialogue extant, in which a ploughman in stating his

duties, says, " I go out at day-break, urging the oxen to the field, and I yoke them to the plough—the oxen being yoked, and the share and cultro fastened on, I ought to plough one entire field or more. I have a boy to threaten the oxen with a goad, who is now hoarse through cold and bawling. I ought, also, to fill the bins of the oxen with hay, and water them, and carry out their soil" (*Turner's Anglo-Saxons*, ii. 546. ed. 5th). Repeated ploughings and fallowings, to prepare the soil for wheat, was the common practice, for Giraldus Cambrensis, speaking of the Welch, says, with astonishment, " they ploughed their lands only once a year, in March or April, in order to sow them with oats; but did not, like other farmers, plough them twice in summer and once in winter, to prepare them for wheat" (*Descript. Cambriæ*, c. viii).

In a law tract, called *Fleta*, and written early in the fourteenth century, are given several agricultural directions, especially upon dressing and ploughing fallows. In summer, the ploughing is advised to be only so deep as to bury and kill the weeds; and the manure not to be applied till just before the last ploughing, which is to be deep (*Fleta*, lib. ii. c. 73).

SOWING was anciently performed in all cases by hand. In the famous antique tapestry of Bayeux, a man is represented sowing. The seed is contained in a cloth fastened round his neck, is supported at the other extremity by his left arm; and he scatters the seed with his right hand.

All agricultural writers, from the earliest era to the present, have recommended the seed to be soaked in some medicament or other previously to sowing. Virgil recommends oil and nitre for beans; others direct the employment of urine; and Heresbachius, who wrote in 1570, mentions the juice of the houseleek. " Sow your ridges," says the same author, " with an equal hand, and all alike in every place, letting your right foot especially, and your hand go together. Wheat, rye, barley, oats, and other large seeds must be sown with a full hand, but rape seeds only with three fingers" (*Googe's Heresbachius*, 246.)

The tapestry of Bayeux, already mentioned, represents a man HARROWING; one harrow only being employed, and one horse. In the time of Heresbachius, though harrowing was the usual mode of covering the seed, yet he says, " in some places it is done with a board tied to the plough." Rakes seem to have been employed by the Anglo-Saxons, for the accurate researches of Mr. Turner do not appear to have discovered any mention of other implements that were employed by them for the purpose (*Hist. Anglo-Sax.* ii. 544).

We find no very early mention made of HOEING by any of our agricultural writers. Though there is generally some directions for " plucking up the naughty weeds," Heresbachius is the first that we have met with who notices the advantage of loosening the surface of the soil about growing crops. " Sometimes," he says, " raking is needful, which, in the spring, loosens the earth made clung by the cold of winter, and letteth in the fresh warmth. It is best to rake wheat, barley, and beans twice. Moreover, they break asunder with a *roller* the larger and stiffer clods" (*Googe's Heresbachius*, 256). It was not till the time of Tull, 1731, that the due importance of this was appreciated.

Of the other operations of agriculture, as reaping, mowing, stacking, and the like, there seems no need of making mention: they were performed much in the same way as now. " Corn," says the author last quoted, " should be cut before it is thorough hard; experience teacheth that if it be cut down in due time, the seed will grow to fullness as it lieth in the barn" (*Ibid.* 406). According to Henry, the practice with our ancestors was for the women to thresh and the men to reap (*Hist. of Britain*, vi. 173).

IRRIGATION seems to have been practiced in a few places in Britain from the time of the Romans, there being meadows near Salisbury which have been irrigated from time immemorial. Lord Bacon mentions it as a practice well understood in his time (1560—1626); and at the same period, 1610, appeared a work by Robert Vaughan, detailing the mode of " summer and winter drowning of meadows and pastures, thereby to make those grounds more fertile ten for one." It was not, however, till the close of the last century that the attention of agriculturists was much aroused to the subject. The writings of Boswell, Wright, Western, and others, between the years 1780 and 1824, partially awakened the farmers to the importance of the practice. The best examples of it are to be observed in Gloucestershire and Wiltshire; but it is now one of the practices of farming that is the most undeservedly neglected. Mr. Welladvise was its great promoter in Gloucestershire.

Live Stock.

Cattle and sheep were the chief riches of the Britons when they became first known to the Romans (*Cæsar*, v. c. 10), and they are still a great source of our agricultural riches.

SHEEP. In a very early Anglo-Saxon MS. a shepherd is represented as saying, " In the first part of the morning I drive my sheep to their pasture, and stand over them in heat and in cold with dogs, lest the wolves destroy them. I lead them back to their folds, and milk them twice a day; and I move their folds and make cheese and butter." (*Turner's Hist. Anglo-Sax.* ii. 546.)

This attention to sheep was attended with so much success that they became an object of acquirement by the continental nations; and in the reign of Edward the Fourth, at the time a treaty of peace was concluded with Spain (1466), a licence was granted by that monarch " for certain Coteswold sheep to be transported to Spain, as people report, which have there so multiplied and increased, that it hath turned the commodity of England much to the Spanish profit, and to the no small hinderance of the gain which was beforetimes in England raised of them."—(*Hall's Chronicle*, 266. *Holinshed*, 668). The sheep thus exported were probably improved by attention and climate till they had become that breed of Merinos which was reimported to this country early in the present century. The statute 3 Henry Sixth, c. 2, forbids the exportation of sheep. The fears which old chroniclers may have ignorantly entertained, that the exporting of sheep would be injurious to our native commerce, have in all succeeding years been proved to be fallacious. The demand for our wool was so large, and the consequent increase

of the breed of sheep was so great, that an impolitic legislature in 1533 endeavoured to check it. The preamble of the act states, that "divers of the king's subjects, to whom God of his goodness hath disposed great plenty and abundance of moveable substance, now of late, within few years, have daily studied, invented, and practised ways and means to accumulate into few hands, as well great multitudes of farms as great plenty of cattle, and in especial sheep, putting such lands as they can get to pasture and not to tillage, whereby they have not only pulled down churches and towns, and enhanced the old rates of the rents, and that no poor man is able to meddle with it, but also have raised the prices of all manner of corn, cattle, &c. almost double above the prices accustomed, to the great injury, &c. of his Majesty's subjects; and as it is thought that the greatest occasion of this accumulation is the profit that cometh of sheep, which now be come to a few persons' hands of this realm, that some have 24,000, some 20,000, &c. by which a good sheep for victual, that was accustomed to be sold for two shillings and fourpence, &c. is now sold for six shillings, &c; which things thus used be principally to the high displeasure of Almighty God, to the decay of the hospitality of this realm, to the diminishing of the king's people, and to the let of cloth-making, &c." It then enacts that no one shall have more than 2000 sheep; though, as a subsequent section declares every hundred to consist of six score, the limited number was 2,400. And it further enacts that no man shall have above two farms. (25th Henry VIII. c. 13).

Harrison, who died in 1593, describes our sheep as very excellent, "sith for sweetness of flesh they pass all other. And so much are our wools to be preferred before those of Milesia and other places, that if Jason had known the value of them that are bred and to be had in Britain, he would never have gone to Colchis to look for any there." (*Description of England, prefixed to Holinshed*, 220). Heresbach, who was a contemporary, gives such a description of the best form and qualities of sheep, that it is evident that the excellence of our breed was not the mere effect of chance. (*Googe's Heresbach.* 1376). From that period till the latter half of the 18th century, we are not acquainted with any efforts further to improve it. This last mentioned period was the era of the improvements effected by Mr. Bakewell and his pupils, the Messrs. Culley.

Bakewell was born in 1726, at Ditchley in Leicestershire, and about the year 1755, commenced those experiments which finally effected a greater improvement in our sheep than was ever effected in any species of agricultural produce by the exertions of one individual. He travelled over England, Ireland, Holland, and other places, for the purpose of examining the various breeds of cattle, and by careful selections, and judicious crosses, succeeded in procuring a stock that obtained for the Ditchley sheep a previously unheard-of excellence. Fortunately the English agriculturists appreciated the importance of his success; and it is a fact that in 1789, three of his rams, the produce of one birth, were let for the breeding season for 1200 guineas, and the whole produce of his letting was at least 3000 guineas. One of his rams obtained for Mr. Bakewell, in one season, 800 guineas; and when it is taken into the calculation that the same animal served for his own flock, it produced for its owner in that year 1200 guineas. Mr. Bakewell died in 1795.

Messrs. Culley introduced these improvements into Northumberland and the other northern counties of this island. When they first settled in that district, the sheep kept there were large, slow-feeding, long-woolled animals; and a breed between those and the Cheviot sheep. These breeds rarely became fat before they were three years old; but the Leicesters introduced by the Messrs. Culley were sold fat at little more than a year old. They at first met with much opposition, but as it was soon seen they were improvers, and not mere innovaters, the flocks have generally been made to improve by their example. They became the general patrons of improvement, and their great attention to minutiæ, unremitting industry, and superior cultivation, gave birth to a spirit of emulation, and their own merits were rewarded with a liberal success. For several years they occupied farms to the amount of about £8000 per annum. They had pupils with liberal premiums from all parts; and these again were the means of making known, not only their enlightened husbandry, but the encouraging illustration they afforded of industry, economy, and intelligence duly rewarded.

Merino sheep were imported by George the Third in the years 1788 and 1791. This breed attracted much attention in 1804, when his Majesty commenced his annual sales. Dr. Parry, Lord Somerville, and others, have paid considerable attention to them; but the climate of this country has a considerable effect in deteriorating their fleeces, and the flesh is too indifferent to permit them to be much encouraged in a country where mutton is so considerable an article of food. (*Hunt's Agricultural Memoirs—Gent.'s Magazine—Encyclop. Brit.*)

Mr. Ellman, of Sussex, during an enlightened practice of more than fifty years, has brought the South Down variety of sheep to a state of the highest improvement. Perhaps the best description of the varieties of the sheep reared in this country has been written by this gentleman for "*Baxter's Agricultural Library.*"

CATTLE, as we have already noticed, have always been a prominent production of this country. They were mentioned by Cæsar, Strabo, and other ancient writers. They have ever since continued, more or less, particularly to engage the attention of the husbandman, not only for the dairy and the plough, but also as a source of food. The breeding of cattle, however, had been so much neglected for the more profitable pasturage of sheep, that in 1555, an act of parliament was passed to remedy the evil. The preamble states that "Forasmuch as of late years a great number of persons in this realm have laid their lands, farms, and pastures to feeding of sheep, oxen, runts, scrubs, steers, and heifers, &c. having no regard or care to breed up young beasts and cattle, whereby is grown great scarcity of cattle and victual;" and therefore it is enacted that a cow shall be kept wherever are sixty sheep, and a calf reared where there are one hundred and twenty, &c. (2 *and* 3 *Phil. and Mary, c.* 3.) Many other legislative enactments occur in the records of that and contiguous periods; but reason and interest are better promoters of improvement than acts of parliament. A due attention to the breeding of cattle was first aroused by Mr. Bakewell, who has just been mentioned as an improver of sheep. He let bulls for one hundred and fifty guineas during four months, and five guineas per cow was no uncommon charge. Pedigrees have been preserved

of different animals with as much care as those of race-horses. The attention and care that have thus been paid to their breeding have met with an appropriate recompense. In no other country is there to be found such breeds of cattle; and that none are so highly estimated, is proved by the prices that have been given for individuals. (*Marshall's Midland Counties*, i. 334. *Parkinson on Live Stock*, ii. 469.)

Horses. That the ancient Britons had horses with which they impelled their war-chariots, we know upon the authority of those who had seen them—Cæsar, Strabo, and others. In the epitome of Dion Cassius, by Xiphelin, those horses are described as small and swift. They appear not to have been usually employed in the operations of agriculture; and their employment was not considered desirable; for in the old Cambrian laws oxen are exclusively directed to be employed. (*Leges Wallicæ*, 288.) Under the Saxons, and still more under the Normans, who flourished here in an age that, from its excelling in noble horsemanship, has been distinguished as the *Chivalric*, the breed of horses was undoubtedly improved. "Richard De Rulos, Lord of Brunne and Deeping, was much addicted to agriculture, and delighted in breeding horses and cattle." (*Ingulphus's Chron.* Lib. 1.)

In the year 1494, the exportation of horses was so extensive, and the price of them in this country was so much enhanced, that an act of parliament ordained that none should go out of the realm without the king's license (2 *Henry VIII.* c. 6—32, cap. 13—33, cap. 5); but these being evidently intended for the improvement of war-horses, "for the defence of the realm," would only collaterally benefit those employed by the husbandman. It was provided by the second of the acts just quoted, that no stallion should be kept that did not measure fifteen hands from the sole of the hoof to the highest part of the wither; each hand to be four standard inches. We find, however, that at this period our draught horses were fine and powerful animals, for Harrison, who lived at this era, and whose Appendix to Holinshed we have before quoted, after expressing his admiration of them, says, that five or six of them would draw with ease three thousand weight of the greatest tale for a long journey. We must remember, too, that in those days the roads were totally different from what they are at present. It is within the memory of persons still living in the hundreds of Essex, that no more than a load of wheat was ever sent out in a waggon, the roads there being, until within less than half-a-century, exceedingly bad.

We have already noticed that in the tapestry of Bayeux, a man is represented harrowing with a horse. That tapestry was woven in the year 1066, and this representation is the first notice, of which we are aware, of the horse being employed in agriculture. The first attempt that our historians notice, to improve the breed of our husbandry horses, was in the reign of King John. Tyrant and despot as he was, yet his evil qualifications gave two benefits to England. His tyranny gave birth to Magna Charta; and his pride rendering it hateful to him to see foreigners surpass him in the excellence of their horses, induced him to import one hundred stallions from Flanders; and from that era may be dated the improvement of our draught horses. His object did not entirely succeed; for a century subsequently, in the reign of Edward the Second, we find that horses were still imported from Lombardy and Flanders. We have already noticed some of the enactments to improve our breed of horses, but these shared the fate of most other compulsory measures, for when Elizabeth summoned her forces to defend her realm, in the prospect of a Spanish invasion, she could obtain no more than 3000 cavalry.

Sir A. Fitzherbert, who wrote in the reign of Henry the Eighth, says in his "*Boke of Husbandry*"—"A husbande may not be without horses and mares, and specially if he goe with a horse plough, he must have both; his horses to droive, and his mares to brynge colts to upholde his stocke, and yet at many times these may droive well if they be well handled." The roguery of horse-dealers was an early sin; for one of the old Cambrian laws provides, that the purchaser of a horse shall have three nights to ascertain whether he is infected with the *staggers*; three months to prove his *lungs*; and twelve months to discover whether he is infected with the *glanders*. For every blemish not discovered before purchasing, if it was not in the ears or tail, one-third of the price was to be returned (*Laws of Howell Dhu.*) The deceptions practiced by the dealers in horses is still proverbial; and there does not appear with their fraternity to have been any intermediate age of innocence, for Sir A. Fitzherbert says, "Thou grayser, that mayest fortune to be of myne opinion or condytion to love horses, and young coltes and foles to go among thy cattle, take hede that thou be not beguiled as I have been a hundred times and more. And first, thou shalt knowe that a good horse has fifty-four properties; that is to say, two of a man, two of a badger, four of a lion, nine of an oxe, nine of a hare, nine of a fox, nine of an asse, and ten of a woman."

Since the days of Elizabeth, every variety of our horses has been gradually improving, and our four kinds, the Suffolk Punch, the Cleveland bays, the Clydesdale, and the Lincolnshire or dray, are surpassed in no country in the world. The numerous cart stallions attending every market-town during the covering season, is an attestation that this care is not on the decrease. It is stated, as a further proof, that a few years since a Suffolk cart mare and her offspring sold at Woodbridge Lady-day fair for one thousand pounds.

Pigs have been among the usual animals fostered by the farmer in times at least as early as the Anglo-Saxons. In those days they were evidently the most numerous of their live stock; scarcely an estate is mentioned without its being stated that it afforded *pannage*, or mast in its wood, for such a number of swine. They were a very prominent portion of their wealth; and indeed a chief necessary, for they were in winter obliged to use almost exclusively salted meat, and the great preponderance of woodland supported best this kind of stock (*Turner's Anglo-Saxons*, iii. 22). Heresbach is particularly earnest in commending the pig; and after mentioning it as abominable to the Jews, says, with a boastful feeling that made him forget its impiety, "I believe, verily, they never tasted the flitches of Westphaly."

Enactments occur in our statute book in 1225 and 1534, regulating the pannage of swine. There are now a great many varieties of pigs, every district of England varying in the size and qualities of those it prefers. Some attention has of late years been paid to improve the stock, but in general they have been too much neglected.

We have not particularized the progress of husbandry in Scotland, because previously to the time of its union with this country, Lord Kames and Mr. Fletcher agree that its agriculture was deplorable; and since then the

improvement of the art in that most generally enlightened part of our island has in many districts outstripped, and, in most, at least kept pace with that of England; and its future advance will probably surpass that of England, because good education is more completely diffused among its inhabitants.

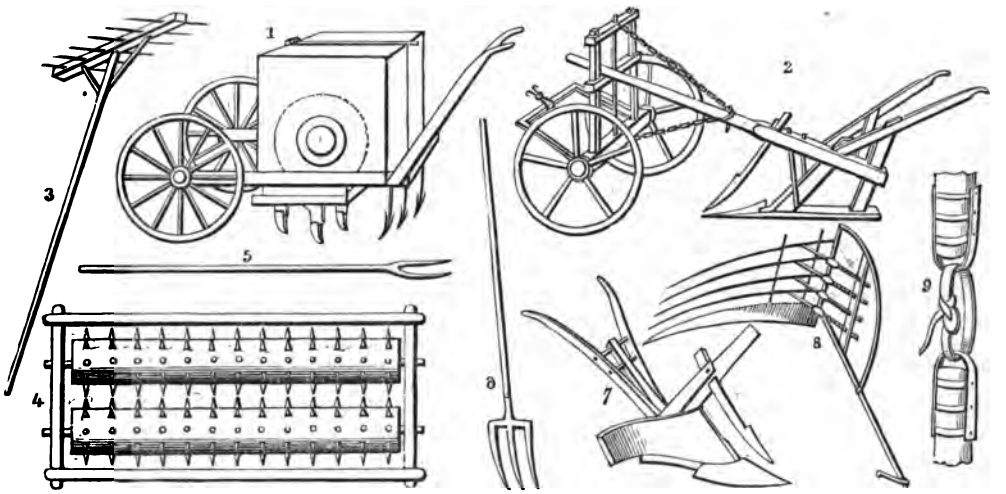
IRELAND is in general deplorably behind us in all the arts of life, nor will this be obviated until the effect of education and wealth is more generally felt and appreciated by its generous and hospitable, but far from wealthy inhabitants.

WALES, for the most part, has an agriculture as bad as that of Ireland; and we cannot have much hope of its improvement, when Mr. Adam Murray, in his evidence before the Committee of Agriculture last year (1833), stated that the Welch have a great antipathy against us Saxons or *Sassenachs*; and that they take every advantage of any *Englishman* that settles among them.

V.

CONTINENTAL AGRICULTURE.

We have now brought to a conclusion our sketch of the progress of agriculture. The limits of our work preclude us from giving more of the ample details that have come under our notice in the research for the materials, of which we have given the abstract. We have not withheld our attention from the husbandry of other nations,



1. Duhemel's sowing machine. 2. Common Flanders plough. 3. Double rake. 4. Double roll harrow. 5. Fork. 6. Three-pronged fork. 7. Modern improved plough. 8. Sithe-rake now in common use in some English counties for cutting cutting corn. 9. Flail joint.

but have found little concerning the history of their progress in the art; and the examination of their present operations made it so apparent, that, with the exception of Flanders, they are all so much behind us in general practice, that the conviction is forced upon us, that little instruction could be obtained from its detail. Several of them, however, excel us in some particular points; and in noticing these we shall avail ourselves of the opportunity to enforce the importance of extra attention to them upon our own agriculturists.

FLANDERS.

This country was certainly the first of modern countries to improve the practice of agriculture. Its farmers were our first tutors; and from the time of Sir Richard Weston, who published an account of their husbandry in 1645, till that of the Reverend T. Radcliff in 1819, the Flemish husbandmen have continued models of neat and economical farming. In this respect we fall short of them. It is a leading principle with them to make their farms closely resemble gardens. Consequently, to effect this, they have small farms, and devote their efforts to these three grand points—the accumulation of manure—the destruction of weeds—and the frequent pulverization of the surface soil. We recommend for the perusal of our readers the work published by Mr. Radcliff, the result of a tour taken by him in Flanders, under the direction of the Dublin Farming Society; and we are thoroughly convinced that they will benefit by the time so occupied. We do not expect that it will induce them to try to cultivate a large surface of land with the minute accuracy of a garden; but it might persuade them to adopt that more cleanly system of cultivation which is the only one that is permanently profitable.

We shall only remark more particularly upon the assiduous care the Flemish farmers bestow upon the collection of manure.

They were the first among the moderns to raise crops for the sake of ploughing them in whilst growing; and they continue it more extensively than any other nation. This practice, we may say, is entirely neglected by our farmers; but if they knew sufficiently of chemistry to understand how much fertilizing materials such green crops impart to the soil, it would be a practice much more extensively adopted. Every fragment of animal and vegetable matter is preserved by the Flemish farmers for the fertilizing of their lands; and the ready sale with which

all such decomposable substances meet, is the cause of the broom and the barrow succeeding in keeping their towns so scrupulously neat. Saw-dust, chips, and similar refuse, all tend to increase their composts; and on their barren lands trees are frequently planted for the purpose of creating a fertile soil by the agency of their fallen leaves.

Their dunghills are so constructed that all the drainage is collected in cisterns, with which liquid is mixed the emptyings of privies, pulverized rape cakes, and the like; and this most fertilizing compound is conveyed to their fields by means of barrels fixed on wheels, and is spread by means of a scoop, 2,840 gallons per acre being allowed for their flax crop.

The slovenly management of his dunghill is one of the most general specimens of the ignorance or carelessness of our country farmers. He allows the most soluble and valuable portions to drain away; and treats with ridicule the idea of carrying out manure in a liquid form. As this arises from ignorance, and bigoted attachment to old practice, it should excite our pity more than our anger. Liquid manures, notwithstanding stupidity and prejudice, are the best of fertilisers, and will, in a coming age, be generally employed, since it is a fallacy to argue that they cannot be employed on a large scale; for the comparative expense of preparation and application is unquestionably smaller on a large scale than on a less. If it were otherwise, if large farms do not admit of the best and most accurate modes of cultivation, the continuance of them in such large connexions is less defensible than we were even before inclined to consider it.

Holland.

The husbandry of this country is almost exclusively confined to the dairy and to stall feeding. There are two points in their practice in which our farmers would do well to imitate them.

It is a common prejudice that a cow for the dairy should never be fat. This is thus far true, namely, that if a cow inclines to fatten easily, she does not yield so much milk as one that generates fat less readily. But a good dairy cow, that is, one that secretes milk abundantly, will not fatten whilst in that condition, and therefore the abstaining from giving them nutritive food is a misdirected conclusion. The Hollanders know that the contrary is the correct practice, and once a day, or oftener, they give their cows rape cake, and other nutritious preparations. The ignorance of our common practice is evident from this fact, that without one exception we always keep other animals, when suckling, much higher than at other periods.

The other point of their practice that merits imitation, is the cleanliness with which they keep all their animals. It will excite a laugh with most of our agricultural readers, when we recommend not only the most scrupulous daily cleaning and washing out of cow-sheds, pig-styes, and the like, but that the animals themselves should be groomed. This, however, is not a mere speculative precept, for the national example of Holland attests its utility. We have known the beneficial effects of such treatment upon the health of cows and pigs in this country. But in the absence of all facts, if the farmer would but allow his own common sense to direct him—if he would but reflect that no animal will thrive that is not healthy; that his horse becomes diseased if not kept clean; and that by no possibility can it be otherwise but that fœtid stenches, and incumbering filth must tend to breed disease, he would not allow so baleful a neglect to continue. It is futile to urge that where the stock is large, the attendance to such treatment is impossible; for if it is beneficial it will pay to adopt it; and no one should engage in a larger concern than he can manage in the most beneficial mode.

Germany.

The inhabitants of the different districts of this extensive empire pay particular attention to the cultivation of timber trees. The number of German books on the subject is excessive.

It is a subject that has of late years been gaining much attention also in this country; and planting will probably be still further extended over many of the poorer soils that at present will not pay whilst producing corn.

The careless and ignorant manner in which the labourer is allowed to mutilate timber trees that grow upon most farms, cannot be too severely deprecated. To train trees correctly requires as much judgment as any operation in which the gardener or forester is concerned. Not an unnecessary wound should be inflicted upon them, for the process of healing each wound, not only deducts so much from the growth of the tree, but is usually the introducer of decay. Yet the hedger, with no other instrument than his bill, is generally allowed an unguided use of so unfit and mutilating a tool.

Lombardy.

In this, and most of the other Italian states, all rivers, and in some, even, all springs, are considered to be the property of the government, for they are the source of a considerable revenue. Any one desiring a canal from a river has to pay for it to the government; and he may cut it through another person's ground without the latter having the power to prevent it, upon paying the value of the land. Such canals are considered as improving the value of an estate, for they irrigate not only their grass lands, but their corn, vines, and other crops, numerous little channels being cut for the purpose down the ridges. The water from a river is purchased at a certain price for so many hours' or days' run in the year, through a sluice of a stated dimension. Mr. Arthur Young mentions that the fee simple of an hour's run per week through a particular sized sluice at Turin, sold in 1788 for 1500 livres. Watered lands usually let for one-third more than lands that are unwatered.

We have already noticed, and shall again have to recur to the subject of irrigation; but we could not but notice the above national evidence in favour of what we know to be one of the most beneficial practices neglected by our agriculturists.

Tuscany.

Sismondi informs us that it is the practice in this country, where he was himself for five years a cultivator, to

trench one-third of the farm every year with the spade, bringing the lower soil to the top. This mode of culture bringing a new soil for the promotion of vegetation, for it has been in a manner lying two years fallow, is sanctioned by reason as well as confirmed by practice. We are not the advocates of a general system of spade husbandry. There are objections to it that at present are insuperable. But we do recommend, and that from our own experience, its partial adoption. There is no parish in England in which many of the labourers are not out of employ during a considerable portion of the year. Perhaps the average of the poor's rates were 10*s.* in the pound upon the farmer's rental; and this might have been reduced more than one-half, if every farmer had employed one man in spade husbandry for every thirty acres he cultivated. Thus he would have had some return for the money he expended; and the saving of horse labour, and the benefit of the extra cultivation, would have turned the balance in his favour, and he would thus have got rid, in a great degree, of the worst of all outlays—an outlay without a possibility of a return.

We have searched various statements of the agriculture of the other European countries, but though we are gratified by the conviction that they are all more or less improving, yet in almost all their practices, except the culture of the vine, they are very far behind us. For that reason we leave them unnoticed, because there is no instruction to be extracted from a detail of deficiencies that have already been overcome. Upon a revision of the whole, we may remark that agriculture, in common with all other kinds of knowledge, is always flourishing, in proportion to the freedom of the people. Spain, subjugated by its despotic monarchy and priesthood, has an agriculture imperfect and degraded beyond that of any other European nation. Flanders has always had a liberal government, and its agriculture improved before our own, and is its equal now.

By freedom, we mean security of property and person, unrestricted discussion of every virtuous opinion, and an untainted distribution of justice. With us, the era that introduced such freedom was that of the reformation, confirmed and strengthened by the exclusion of the Stuarts in 1688.

The introduction of the scholastic philosophy, which revived that activity of mind which the Grecian vanity had so much abused, and the Romans, by their gross habits, had so long paralysed; the mathematical sciences which the Grecians had imported from Alexandria and had forgotten; that natural and experimental knowledge which neither the Grecians nor Romans had ever much or permanently pursued; the reformation of religion, which removed from the mind that incubus that forbad man to trust to his own reason, but made it the bond-slave of interested ignorance; the invention of printing, which became the mighty engine of diffusing accumulated knowledge; were all events that preceded the seventeenth century, and rendered it an era splendid by the general improvement which it afforded in all the arts and sciences. These have justly been represented as forming a circle, for they are so united, so blended together, and so co-assistant, that one cannot be improved without the benefit being shared in some way by the others.

Agriculture participated in the general progress; and the impetus that was given to the human mind, tutoring it to follow reason rather than habit, was felt by the cultivators of the soil. The eighteenth and present centuries have been those in which the improvement has been marked, and the instances of which have already been noticed. The reason of this is to be found in its having then very generally engaged the attention of a more enlightened class of society. The noblemen, the gentry, and even the monarch of England, became practical agriculturists; and under the patronage of George the Third, the Duke of Bedford, Lords Sheffield, Suffield, and Albemarle, Messrs. Coke, Western, and others, it was sure to obtain the benefit of all the improved knowledge of the day. In 1723 was instituted the Society of Improvers in the knowledge of Agriculture in Scotland; in 1749, the Dublin Agricultural Society; in 1777, the Bath and West of England Society; in 1784, the Highland Society of Scotland; and in 1793, the London Board of Agriculture. From none of these have arisen any splendid discoveries, for such are not to be made in agriculture: there can never arise, so far as we can foresee, any Newton or Watt in this art; but they have effected all that such associations can be expected to accomplish. They have occasioned the collision of opinion, they have stimulated the desire of improvement, and they have promoted the general communication of its acquirement.

Of the benefits conferred by other sciences upon agriculture; by chemistry, botany, and physiology, we have little to say; they are branches of knowledge too seldom combined with practical skill to have yet accomplished much; but of what they are capable of achieving, an estimate may be formed from the perusal of De Candolle's Physiologie Vegetale. "It is certain," as the writer of this has elsewhere observed, "that a cultivator of the soil should have a knowledge of botany and of chemistry. Without the first he will be unable to understand terms and observations that must occur in every well written work on his art; unable to comprehend the nature and habits of the objects of his culture, or to render observations which he makes, intelligible to others or even to himself. Chemistry is of as much, if not greater importance to him. The nature of soils, of manures, of the food and functions of plants, would all be unknown but from the analyses which chemists have made. Science can never supersede the use of the dunghill, the plough, the spade, and the hoe; but it can be one of their best guides—can be a pilot even to the most experienced" (*Baxter's Agricultural Library*, 140).

Of the literature of agriculture we have little to say in this place. From the days of Hesiod until the sixteenth century, the authors upon this art were very few; but from that period to the present they have continued to increase; and its literature, if now collected, would form a copious library.

There have been professorships of agriculture for some time proposed at the Universities of Oxford and Cambridge. There was one appointed at Edinburgh in 1790, and the chair is still (1834) filled by Mr. Low.

A prejudice too generally exists amongst farmers against the agricultural knowledge contained in books; and till they are generally better educated, this prejudice will continue. Ignorance is always bigoted and obstinate; and it is the same mental sterility which makes them jealous of all new practices, that made the Irish persist in fastening their horses to the plough by their tails, until it was absolutely prohibited by the government. The Irish

said in defence of their practice what most English farmers say in defence of theirs, however erroneous—"My grandfather did well enough this way." Such foolish observations amount to no more than this—"We will not try to improve." This race of stagnant cultivators is gradually disappearing; and those who are succeeding them, we see reason to believe, are more enlightened, and consequently more ready to adopt improvements. We most heartily rejoice at this; and we hope to see them more and more a class of reading men. Practice must ever be their chief tutor, as in all other arts; but likewise, as in all other arts, that practice will always be the most correct in its details, which is founded upon reasoned knowledge. [S. J.]

AGRIMONIA. Agrimony. *Dodecandria Digynia*, Linnæus; *Rosaceæ*, Jussieu. Calyx top-shaped above, and burdock-like on the border, five-parted; petals five, borne by the calyx; stamens fifteen; seeds in the bottom of the hardened calyx; leaves wing-cleft.

1. Dahurian Agrimony (*A. Dahurica*, Willdenow). An ornamental deciduous perennial, three feet high, from Dahuria in 1811: smooth; leaves interruptedly wing-cleft; similar to *A. Eupatoria*, but distinct; leaves more narrow, and more pointed; flowers more remote, and something less; flowers, in July and August, yellow; propagated by division in common soil.

2. Common Agrimony (*A. Eupatoria*, Linnæus). A British deciduous perennial, three feet high, common in fields: hairy; stem-leaves winged; leaflets elliptic, oblong, terminal; calyx bristly; flowers, in June and July, numerous, yellow, in a longish tapering spike; propagated by division in common soil.—Eng. Bot., 1335.

3. Nepal Agrimony (*A. Nepalensis*, D. Don). An ornamental deciduous perennial, three feet high, from Nepal in 1820: leaves interruptedly wing-cleft; lobes egg-oblong, saw-toothed; segments of the calyx lance-shaped, pointed, keeled; flowers, in July and August, yellow; clusters of flowers straight, slender-flowered; propagated by division in common soil.

4. Fragrant Agrimony (*A. odorata*, Lamarck). An ornamental deciduous perennial, four feet high, from Italy in 1640: leaves interruptedly wing-cleft; lobes oblong, lance-shaped, deeply nicked, toothed; flowers, in July, yellow; petals double the length of the calyx: propagated by division in common soil.—Camer. Hort. 7.

5. Small-flowered Agrimony (*A. parviflora*, Hort. Kew). An ornamental deciduous perennial, two feet high, from North America in 1776: rather smooth; leaves interruptedly wing-cleft; lobes many, line-like, lance-shaped, cut, saw-toothed; tube of the calyx top-shaped; flowers, in July, yellow; petals half as long as the calyx; propagated by division in common soil.

6. Hairy Agrimony (*A. pilosa*, Ledebour). An ornamental deciduous perennial, three feet high, from Siberia in 1819: leaves interruptedly wing-cut; leaflets broad-lance-shaped; flowers, in July and August, yellow; petals almost doubly longer than the calyx; fruit bristly; propagated by division in common soil.

7. Creeping Agrimony (*A. repens*, Linnæus). An ornamental deciduous perennial, two feet high, from the Levant in 1737: leaves wing-cleft; lobes oblong, terminal, sitting; flower-spikes somewhat sitting; flowers, from July till September, yellow; petals doubly longer than the calyx; propagated by division in common soil.

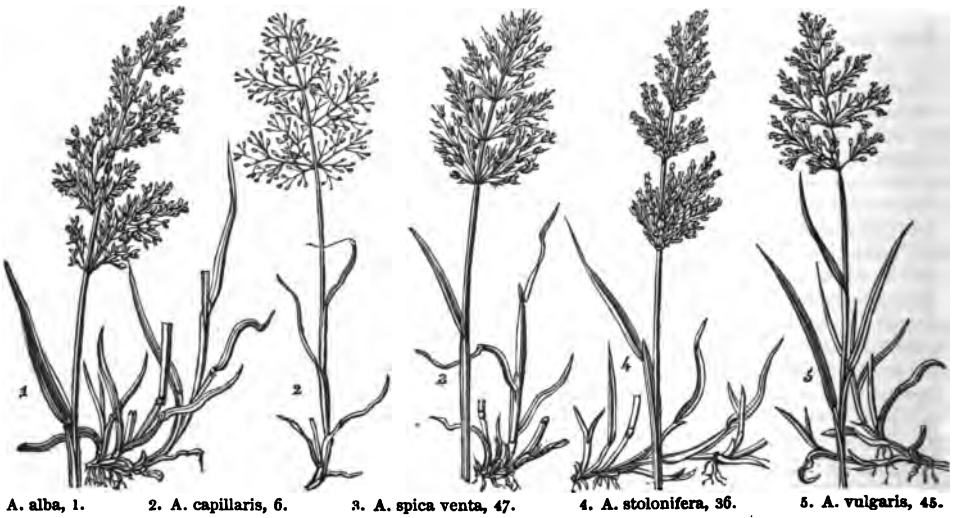
8. Streaked Agrimony (*A. striata*, Michaux). An ornamental deciduous perennial, two feet high, from North America in 1812: spikes twiggy; flowers, from June till August, white; fruit bent back, top-shaped, furrowed, crowded with hairs; propagated by division in common soil.

9. Sweet-scented Agrimony (*A. suaveolens*, Pursh). An ornamental deciduous perennial, three feet high, from Virginia in 1810: very bristly; leaves interruptedly wing-cut; lobes lance-shaped, saw-toothed; spikes twiggy, clammy; flowers, from July till August, somewhat sitting; petals twice as long as the calyx; fruit inversely conical, straggling, bristly; propagated by division in common soil. [G. L.]

AGROSTEMMA, Linnæus. A genus now united to *Lychnis*.

AGROSTIDEÆ, Kunth. Agrostidean Grasses, characterised by uniflorous spikes, very rarely with another small awl-shaped upper flower; husk and chaff two, membrano-herbaceous, the under one often awned; pistils for the most part without styles.

AGROSTIS, Linnæus (from the Greek, *αγρος*, "a field"). Bent Grass. *Triandria Digynia*, Linnæus; *Gramineæ*, Jussieu. Spikelets one-flowered; husks (*glumæ*) two, keeled, awnless; chaff (*palea*) two, rarely awnless;



1. A. alba, 1. 2. A. capillaris, 6. 3. A. spica venta, 47. 4. A. stolonifera, 36. 5. A. vulgaris, 45.

stamens one to three; pistils two, plumed, and nearly without styles; seed-organ (*ovarium*) smooth and shining; chaff-scales (*squamulæ*) two; seed free, smooth, and shining.

I.

1. White Bent Grass (*A. alba*, Schrader). A British creeping perennial, one foot and a half high; panicle diffuse, hairy, oblong-conical; branches spreading, or bent back and rough; sheath-scale (*ligula*) oblong; leaves line-like; propagated by seeds in marshy soil. *A. stolonifera*, Linnæus; *A. mutabilis*, Sibthorp.—Flor. Dan. T. 564.

Var. a. A. alba, Linnæus; *A. polymorpha*, Hudson.

Var. b. A. decumbens, Gand.

Var. c. A. alba, Hoffmansegg.

Var. d. A. compressa, Willdenow.

Var. e. A. sylvatica, Linnæus.

2. Alpine Bent Grass (*A. alpina*, Scopoli). Panicle oval-oblong; with roughish spreading branches; husks lance-shaped, taper-pointed; florets awned at the base. *Trichodium rupestre*, Schrad. Germ., I. 279, Tab. 3, f. 5.

3. Bergian Bent Grass (*A. Bergiana*, Trinius). A native of the Cape of Good Hope: panicle spreading, few-flowered; the chaff as long as the husks; the upper valve a little less. *A. Capensis*, Stendel.

4. Tufted Bent Grass (*A. cæspitosa*, Gaudich). A native of the Straits of Magellan: straw erect, simple, streaked, smooth; leaves perfectly flat, rough; panicle spike-formed, erect, interrupted at the base; the husks somewhat equal, twice as long as the chaff; awns the length of the husk.

5. Brown Bent Grass (*A. canina*, Linnæus). A perennial, one foot and a half high, from Siberia: panicle diffuse, egg-oblong; branches diverging, roughish; husk-valves egg-oblong-pointed; florets awned below the middle; root-leaves bristle-shaped. *Leers*, Herb., No. 52, Tab. 4, f. 2.

6. Fine Bent Grass (*A. capillaris*, Linnæus). A European perennial, six inches high; panicle capillary, spreading, wavy; husks awl-shaped, equal, smooth, awnless. *Vilfa capillaris*, Beauvois.

7. Cornucopian Bent Grass (*A. Cornucopiæ*, Fraser). A perennial from North America in 1786: panicle very branchy; branchlets three-forked, much spreading, rough; husks pointed; chaff awnless; straw lying down, branching. *Trichodium decumbens*, Michaux; *A. anomala*, Willdenow.—Fras., Monogr. Icon.

8. Hairy Bent Grass (*A. crinita*, R. Brown). A native of New Holland: panicle longish; husks rather tapering to a point; the outer valves of the chaff one-third shorter than the husks; one pistil; leaf-sheaths rather rough. *Anthoxanthum crinitum*, Linnæus.

9. Unequal Bent Grass (*A. dispar*, Michaux). A perennial from North America: erect; panicle lax, somewhat whirled and pyramidal, many-flowered; husks awnless, with the outer valves much the largest, those of the interior very small. *Vilfa dispar*, Beauvois.

10. Sweet Bent Grass (*A. dulcis*, Sibthorp). An annual from Mexico: straw simple; somewhat knee-jointed; leaves rough; leaf-sheath smooth; panicle very branchy, narrow, and somewhat whirled; husks equal; chaff awnless, rather equal, and one-half shorter than the husk. *Vilfa dulcis*, Beauvois.

11. Elegant Bent Grass (*A. elegans*, Thore). An annual from the south of France: leaves erect, rolled inwards, awl-shaped; straw erect, simple; panicle lax, capillary; husks smooth, sharp-pointed; chaff blunt, one-valved. *Trichodium elegans*, Römer.

12. Ploughed Bent Grass (*A. exarata*, Trinius). A native of Unalaska: straw erect, with simple, furrowed, streaked, smooth, and shining leaf-sheaths; leaves line-like, tapering; panicle branchy, erect; branches half-whirled, bristly; husks tapering, the keel toothed, twice as long as the awnless floret.—Trinius, Icon., III. 27.

13. Fascicled Bent Grass (*A. fasciculata*, Roemer). A perennial from Quito: straw erect, knee-jointed, ascending, branching, rooting below; leaves plane, rough on each side the margin; leaf-sheath smooth and shining; panicle very branchy, whirled, diffuse; husks rather equal, longer than the floret; upper valve of the chaff minute, lower valve awnless. *Vilfa fasciculata*, Humboldt.

14. Twin Bent Grass (*A. geminata*, Trinius). A native of the Aleutian Islands, growing in dense patches: straw plane, erect, knee-jointed, ascending, thread-shaped, smooth, and shining; leaf-sheath furrowed, smooth, and shining; leaves very narrow, smooth; panicle branchy, diffuse; branches in pairs; husks very sharp, the lower largest, doubly longer than the awned floret; awn bristly, nearly the length of the husk.

15. Headed Bent Grass (*A. glomerata*, Kunth). A perennial from Peru: straw erect, tapering, simple; leaf-sheath and leaves with a flat surface, and rough; panicle erect, spike-shaped, interrupted; husks unequal, longer than the florets; chaff equal, with the tip tooth-cleft. *Vilfa glomerata*, Presl.

16. Sea-green Bent Grass (*A. glaucina*, Bastard). A perennial of the south of France: leaves very narrow, with a flat surface, sea-green; panicle narrow; foot-stalks rough; husks with pointed, somewhat equal valves, rather longer than the chaff; awns at the base jointed, rather longer than the spikelet. *Trichodium glaucinum*, Römer.

17. Involute Bent Grass (*A. involuta*, Poiret). A native of Morocco: panicle narrow, spiked; leaves smooth and shining, rolled inwards, awl-shaped; straw branching, knee-jointed. *Vilfa involuta*, Beauvois.

18. Juress's Bent Grass (*A. Juressi*, Link). A perennial, one foot high, from Spain and Germany in 1820: leaves with a flat surface; sheath-scale short, rather blunt; panicle narrow; valves of the husk somewhat equal, rather blunt; on the back minutely toothed.—Trinius, Icon., III. T. 29.

19. Lax-flowered Bent Grass (*A. laxiflora*, Richard). An annual, two feet high, from North America in 1818: straw erect, simple, thread-shaped, streaked, smooth; leaves rolled up, bristle-like, rather rough; leaf-sheath furrow-streaked, smooth and shining; sheath-scale longish; panicle diffuse; husks nearly equal, one-ribbed, longer than the awnless floret; chaff minute. *A. scabra*, Willdenow; *Trichodium laxiflorum*, Michaux, I. 42, T. 8.

20. Lobed Bent Grass (*A. lobata*, R. Brown). A native of Van Diemen's Land: stamens three; panicle somewhat spiked, decompound, lobed; branches and branchlets tiled; husks taper-pointed, rather unequal, and longer than the chaff; valves of the chaff rather rough, with a tip four-toothed, somewhat equal, bearded near the base. *Vilfa? lobata*, Beauvois.

21. Magellanic Bent Grass (*A. Magellanica*, Lamarck). A native of the Straits of Magellan: husks hairy, doubly longer than the chaff; the bent back awn of the outer valve of the chaff rather long. *Vilfa? Magellanica*, Beauvois.

22. Sea-side Bent Grass (*A. maritima*, Lamarck.) A perennial, one foot high, from France in 1818: panicle spiked; with very short branches; husk awnless, smooth, equal; chaff two-valved. *Vilfa maritima*, Beauvois.

Var. a. A. subrepens, De Candolle.

23. Mexican Bent Grass (*A. Mexicana*, Presl). A perennial from Mexico: straw erect, smooth and shining; leaves with a flat surface; leaf-sheaths rough; panicle narrow, spike-shaped; spikelets lance-shaped; husks taper-pointed, rough, longer than the chaff; awns longer than the spikelets. *Agraulus Mexicanus*, Presl.

24. Mountain Bent Grass (*A. montana*, R. Brown). A native of Van Diemen's Land: stamens three; panicle somewhat cylindrical; branches tiled; husks taper-pointed; the outer valve of the chaff downy, rather rough, with a two-

toothed tip, awned below the middle; leaves rolled inwards, bristly. *A. monticula*, Römer.

25. Monte Video Bent Grass (*A. Montevidensis*, Sprengel). A perennial from Monte Video: straw branching; leaves line-like, rather rough on the inside, and outwardly with smooth and shining leaf-sheaths; panicle diffuse; branches three-forked, bristly, rough; spikes on long footstalks; husks equal, keel rough; lower valve of the chaff four-ribbed above; upper valve minute.—Kunth, Gram., II. 169.

26. Shagreen Bent Grass (*A. muricata*, Kunth). Straw erect, and with smooth, tapering leaf-sheaths; leaves rough; sheath-scale egg-oblong; panicle erect, narrow, spike-lobed; husks nearly equal, bristly on the rib; floret one half shorter, sword-pointed. *Vilfa muricata*, Presl.

27. Nootka Bent Grass (*A. Nutkaensis*, Kunth). A native of Nootka Sound: straw erect, tapering, very smooth; with leaves and leaf-sheaths rough; sheath-scale egg-oblong; panicle branchy, spreading; the husk rough on the rib, and longer than the four-toothed chaff. *Trichodium album*, Presl.

28. Pale Bent Grass (*A. pallida*, De Candolle). An annual, six inches high, from the south of Europe in 1819: straw erect, rather knee-jointed; leaves with a flat surface, very narrow; sheath-scale oblong, two-toothed; panicle very branchy; husks with somewhat equal valves, doubly longer than the chaff; awn doubly longer than the chaff. *A. anemagrostoides*, Trinius, Icon., III., T. 30.

29. Fair Bent Grass (*A. pulchella*, Kunth). A perennial from Quito: straw erect, simple; leaves with a flat surface, rough on the inside, and outwardly with smooth leaf-sheaths, longish, split, smooth; panicle very branchy, whirled, diffuse; husks nearly equal, longer than the floret; upper valve of the chaff wanting, lower valve awnless and five-ribbed. *A. elegans*, Römer.—Kunth, Gram., II. 128.

30. Minute Bent Grass (*A. pusilla*, Dumortier). A native of Belgium: husks with the keel rough; chaff bearded below the middle; beard knee-jointed, white; root-leaves bristle-like; sheath-scale of the lower leaves blunt, of the upper much divided; root creeping. *Trichodium pusillum*, Van Hall.

31. Four-awned Bent Grass (*A. quadriseta*, R. Brown). A native of New Holland: stamens three; panicle cylindrical; branches and branchlets tiled; husks pointed; the outer valve of the chaff smooth, bearded beneath the middle of the back, doubly longer than the husks; tip four-toothed, teeth bristle-like, the inner shorter.

32. Rare Bent Grass (*A. rara*, R. Brown). A native of New Holland: one stamen; panicle somewhat close; branches few-flowered; the outer valve of the chaff as long as the husk; leaf-sheaths rather rough. *Vilfa? rara*, Beauvois.

33. Rock Bent Grass (*A. rupestris*, Allioni). A perennial from the middle of Europe: panicle narrow, oblong; branches spreading, smooth; husks lance-shaped, pointed; florets awned beneath the middle; root-leaves bristle-like. *A. setacea*, Villers; *A. alpina*, Willdenow.

34. Squirrel Bent Grass (*A. sciurea*, R. Brown). A native of New Holland: one stamen; panicle longish; husks tapering to a point; outer valve of the chaff notched, as long as the smaller valve of the husk; awns four times longer than the valves; leaf-sheaths smooth.

35. Bristle Bent Grass (*A. setacea*, Curtis). A perennial from France: husks lance-shaped; chaff awned at the base; awn knee-jointed; root-leaves bristle-like. *A. setifolia*, Botier; *A. canina*, *α*, Withering.

36. Creeping Bent Grass (*A. stolonifera*, Smith), or Fiorin. A creeping British perennial, one foot high, common in moist meadows: straw branchy and creeping; leaves in the end of April; flowers in July; panicle close and clustered; valves of the husk equal, spear-shaped, and downy. *A. polymorpha*, *α*, Hudson; *A. verticillata*, Villers; *Vilfa stolonifera*, Beauvois. Propagated by seeds or cuttings. —Trinius, Icon., III., T. 36.

37. Straw Yellow Bent Grass (*A. straminea*, Hartmann). Found on the shores of Holland: panicle oblong; branches smooth; outer valve of the chaff awned above the middle of the back; awn equal to the husk; sheath-scale oblong.

38. Straight Bent Grass (*A. stricta*, Willdenow). From North America: panicle longish, very straight; chaff less than the husk; awn from the base of the chaff-valve, twisted, longer than the flower. *Trichodium strictum*, Römer.

39. Most Slender Bent Grass (*A. tenerrima*, Trinius). From the south of Spain: smooth; awnless; chaff rather shorter than the blunt husk; leaves bristle-like. *A. pulchella*, Loiseleur.

40. Slender-leaved Bent Grass (*A. tenuifolia*, Bieberstein). A perennial, one foot high, from the Caucasus in 1820: panicle oblong, rather spreading, rough; husks equal-pointed; leaves line-like, bristle-shaped.

41. Tollucco Bent Grass (*A. Tolluccensis*, Humboldt). A perennial from Mexico: straw erect, with smooth leaves; panicle branchy, close; husks rough on the back, equal; chaff one-half shorter than the husk; awn somewhat equal to the husk.

42. Hair-like Bent Grass (*A. trichodes*, Roemer). An annual from Peru: straw knee-jointed, ascending, simple; leaves and leaf-sheaths rough; panicle branchy, whirled, diffuse; husks equal, fringed on the back; chaff a little longer than the husk.

43. Tropical Bent Grass (*A. tropica*, Beauvois). A perennial from the Isle of France: panicle close; awn inserted above the middle.

44. Greenish Bent Grass (*A. virescens*, Humboldt). A perennial from Mexico: straw erect, simple, smooth; leaves rough; panicle branchy, whirled; husks equal, fringed on the back, rough; chaff one-half shorter than the husk; awn somewhat equal to the husk.

45. Common Bent Grass (*A. vulgaris*, Smith). A British perennial, one foot and a half high: panicle egg-oblong; branchlets diverging, rather rough; sheath-scale short, abrupt; leaves line-like.

Var. α. A. stolonifera, Leers.—Schrad. Germ., I. 206, Tab. 3, f. 1.

II.

ANOMALOUS SPECIES.

46. Interrupted Bent Grass (*A. interrupta*, Linnæus). An annual, two feet high, from the south of Europe in 1820: panicle narrow, close; branches half whirled; the lower ones distant; awn very long, wavy, beneath the tip of the outer valve of the chaff; anthers somewhat oval.

47. Wind Spike Bent Grass (*A. spica-venti*, Linnæus). A British annual, four feet high: panicle whirled, spreading; awn very long, below the end of the outer valve of the chaff; anthers line-like, oblong.

III.

DOUBTFUL SPECIES.

48. Kin Bent Grass (*A. affinis*, Schultes). A perennial from Pannonia: branches of the panicle three-forked, straggling, wavy; husks pointed; awn almost from the middle of the back.

49. Airoidan Bent Grass (*A. airoides*, Torrey). From North America: panicle pyramidal, smooth; chaff shorter than the husks; valves, one sharp, the other blunt; leaves

line-like, smooth and shining; leaf-sheath bearded at the mouth.

50. Spider Bent Grass (*A. arachnoides*, Elliot). From North America: panicle longish, slender; husks equalling the one-valved chaff; awn long, weak, on the back.

51. Reed Bent Grass (*A. arundinacea*, Presl). A perennial from Peru: straw erect, simple, with rough leaves; leaf-sheath smooth and shining; panicle branchy, close, nodding; husks somewhat equal, rough on the rib; awn shorter than the chaff.

52. Short-spiked Bent Grass (*A. brachystachys*, Schultes). From Sicily: panicle spiked, somewhat one-sided: husk lance-shaped, pointed; chaff and husks rough on the back; straw at the base very branchy, lying down; leaves short, plane.

53. Short-leaved Bent Grass (*A. brevifolia*, Nuttall). Found on the banks of the river Missouri: straw solid, flattish, somewhat turfy and branched at base, erect; leaves narrow, awl-shaped, much shorter than the straw; panicle compound of alternate interrupted branches; husk equal, tapering to a point much shorter than the chaff.

54. Clubbed Bent Grass (*A. clavata*, Trinius). From Kamtschatka: straw erect, rather flattish; leaves line-like, rough; sheath-scale oblong; panicle erect, rather lax, nodding at top; branches half whirled.

55. Tufted Bent Grass (*A. comosa*, Poiret). From Italy: panicle large, nodding; flowers awned; leaves somewhat rough.

56. Composite Bent Grass (*A. composita*, Poiret). From Carolina: panicles composed of foot-stalks, very branchy; spike erect; chaff pointed, longer than the husk; leaves rough, very long.

57. Flattish Bent Grass (*A. compressa*, Poiret). From Carolina: panicle longish; foot-stalks somewhat whirled; chaff flattish; valves of the husk unequal, awnless; the outer pointed, longer.

58. Fork-leaved Bent Grass (*A. distichophylla*, Roemer). From New Holland: panicle very simple, branch-spiked; husks equal; chaff shorter; leaves rather rigid, sword-shaped, complicated, bristle-like, forked.

59. Effuse Bent Grass (*A. effusa*, Sprengel). From Portugal: straw rooting at the base, smooth; leaf-sheaths rather lax, smooth; sheath-scale blunt; leaves narrow, line-like, short; panicle rather lax, erect.

60. Thread-leaved Bent Grass (*A. filifolia*, Link). From Portugal: straw very branchy; leaves rolled inwards, thread-shaped, very slender; panicle close.

61. Shining Bent Grass (*A. glabra*, Presl). From Chili: straw tapering to a point, with smooth leaf-sheaths; leaves rough; panicle half-whirled, much spreading; spike-stem very smooth; chaff shorter than the husk, four-toothed, five-ribbed.

62. Slender Bent Grass (*A. gracilis*, Schultes). A perennial from Pannonia: panicle as if starved; branches somewhat bristly; sheath-scale very short; leaves very narrow.

63. Rough Bent Grass (*A. hirsuta*, Linnæus). From Teneriffe: panicle somewhat spiked; straw and leaves hairy; chaff awned at the back, two-cleft at the tip.

64. Hygrometric Bent Grass (*A. hygrometrica*, Nees Von Esenbeck). An annual from Brazil: panicle with branches spike-formed, somewhat bundled, rough; spikelets somewhat sitting; leaves line-like, narrow, smooth.

65. Kitaibel's Bent Grass (*A. Kitaibellii*, Schultes). A perennial from Pannonia: panicle narrow, before and after flowering; awn somewhat in the middle of the back; straw ascending.

66 Greatest Bent Grass (*A. maxima*, Roxburgh). A perennial, four to twelve feet high, from the East Indies: straw erect; panicle egg-oblong, expanding; husks minute; outer valve of the chaff fringed, with long hairs; stamens two.

67. Medium Bent Grass (*A. media*, Carmichael). From the island of Tristan d'Acunha: straw thread-shaped, branching; leaves bristle-like; panicle simple, distant; chaff pointed, downy.

68. Michaux's Bent Grass (*A. Michauxii*, Zuccagni). From Kentucky: panicle narrow, awned; branches lateral, alternate; straw ivory-white; leaves rough.

69. One-stamened Bent Grass (*A. monandra*, Hornemann). An annual from North America; panicle effused; awn of the outer value terminal.

70. Sword-pointed Bent Grass (*A. mucronata*, Presl.) Straw, with leaf-sheaths and leaves rough, having a flat surface; panicle narrow, somewhat spiked; lower chaff five-ribbed; awned on the back.

71. Neglected Bent Grass (*A. neglecta*, Schultes). A perennial from Pannonia: panicle as if starved, spreading; awn from the middle of the back; straw erect; root fibrous.

72. New York Bent Grass (*A. Novaboracensis*, Sprengel). Panicles lax, with branches alternate, somewhat bundled, with hair-like, equal, very smooth husks; leaves narrow, and with flaccid smooth leaf-sheaths; sheath-scale longish, blunt.

73. Fragrant Bent Grass (*A. odorata*, Loureiro). Found on the shores of Cochin China: spikes one-sided, awnless; valves of the husk pointed; chaff somewhat equal, longer than the husk; straw erect, leafy; leaf awl-shaped.

74. Smaller Bent Grass (*A. parvula*, Schultes). A perennial, from Pannonia: panicle fruit-bearing, narrow, somewhat spiked; straw ascending.

75. Few-flowered Bent Grass (*A. pauciflora*, Pursh). A perennial from Virginia: branches one-flowered, thread-shaped; chaff awned, with an unequal husk, doubly longer, hairy; leaf-sheaths velvety.

76. Plebeian Bent Grass (*A. plebeia*, R. Brown). A perennial, one foot high, from New Holland in 1806: keels of the chaff rather naked; outer valve of the husk very long, downy, doubly awned at top; awn at the base of chaff doubly longer; leaves somewhat bristle-like.

78. Plaited Bent Grass (*A. plicata*, Loureiro). From China: leaves plaited; spike line-like, awnless; straw straight, leafy; spikes forked; all the valves awnless.

79. Presl's Bent Grass (*A. Preslei*, Presl.) Turfy: leaves rigid, short, channelled, blunt, smooth; straw-tapered; panicle close, spiked, egg-oblong; awn produced above the base, straight.

80. Tall Bent Grass (*A. procera*, Retzius). From Malabar: panicles with the foot-stalks branching, rather erect; flowers hairy, awnless, lance-shaped.

81. Stiff Bent Grass (*A. rigescens*, Presl.) Turfy: leaves stiff; straw high, channelled, very smooth; panicle narrow, spike-shaped, line-like; awn from the middle of the back, straight.

82. Salmantic Bent Grass (*A. Salmantica*, Kunth). An annual from Spain: panicle spreading; chaff tapering to a point, somewhat equal; awn shorter than the husk.

83. Schultes's Bent Grass (*A. Schultesii*, Kunth). A perennial from Pannonia: panicle somewhat three-forked; husks with valves tapering to a point; awn of the valve above the base; leaves rolled up, bristle-like.

84. Sicilian Bent Grass (*A. Sicula*, Kunth). From Sicily; panicle contracted; leaves short, rigid, sea-green.

85. Torrey's Bent Grass (*A. Torreyi*, Sprengel). Found on the banks of the river Missouri: panicles narrow; husk spear-pointed; straw turfy; leaves forked, rigid, rolled up.

86. Hairy-flowered Bent Grass (*A. trichantha*, Schrank). From Labrador: panicle close; branches erect; awn from the base of chaff equal; husk not equal; leaves very narrow, rolled inwards.

87. Awled Bent Grass (*A. trichopodes*, Elliot). From North America: panicle diffuse, hair-like; valve of the chaff shortly awned; sheath-scale longish.

88. Valentian Bent Grass (*A. Valentina*, Roemer). A perennial from Spain: panicles with hispid branches; branchlets somewhat appressed; sheath-scale lengthened; root creeping; leaves somewhat rolled up, rather rigid. [M. K.]

AGRUNA, not *Agruma*. The aloe.

AGYNEIA, Willdenow (from the Greek, α, "without," and γυνη "pistil"). Pistilless. *Monœcia Monadelphia*, Linnæus; *Euphorbiaceæ*, Jussieu. A small genus of oriental plants, characterised by the name. Male flowers with the calyx wheel-shaped, equally six-lobed; stamens three; female flowers with the calyx six-parted, three of the divisions on the inside; fruit at the base of the persistent calyx.

1. Bertero's Pistilless (*A. Berterii*, Sprengel). A tree from the banks of the Magdalena: leaves oblong, pointed, entire, very smooth; flowers on one-flowered stalks.

2. Smooth Pistilless (*A. impubes*, Linnæus). A hardy annual, one foot high, from China in 1820: leaves oval, blunt, smooth; flowers, in July and August, green, on few-flowered, terminal stalks; propagated by seeds in sandy loam.

3. Phyllanthan Pistilless (*A. phyllanthoides*, Sprengel). A native of Coromandel: leaves oblong, stiff-pointed; flowers on axillary and rather solitary foot-stalks. *Phyllanthus bacciformis*, Linnæus.

4. Hairy Pistilless (*A. pubera*, Linnæus). An evergreen stove shrub, three feet high, from China in 1823: leaves egg-oblong, blunt, entire, downy beneath; flowers green, on few-flowered, terminal stalks; propagated by cuttings. [G. L.]

AGYRIUM, Fries (from the Greek ἀγυρις, "a cluster"). Cluster Mould. *Cryptogamia Fungi*, Linnæus; *Hymenomycetes Tremellini*, Fries. The receptacle smooth, waxy, and at length crumbling away into spore-cases.

1. Greenish Cluster Mould (*A. cæsium*, Fries). Clustered, but each plant nearly distinct, in form of a point; on dead pine wood.

2. Reddish Cluster Mould (*A. rufum*, Fries). Is chiefly distinguished from *A. cæsium*, by the colour.—Greville, Crypt. Fl. 232. [G. L.]

AH-DHRUNG. A term lately introduced into veterinary writings, as used by the natives of India to designate a species of palsy (*paraplegia*) to which horses are there subject. It will be noticed under KUMREE. [C. S.]

AIDELUS, Sprengel (from the Greek, ἀιδηλος, "invisible," the flowers being minute). Small-flower. *Diandria Monogynia*, Linnæus; *Caryophylleæ?* Jussieu. Calyx four-parted; petals four, sharp; stamens very short; pistil without a style; capsule flattish, one-celled, two-valved.—Hort. Hal. 1825.

1. Nepal Small-flower (*A. micranthus*, Sprengel). A smooth-branched, procumbent herb of Nepal: leaves opposite, oblong, toothed; flowers small, white?, on axillary, solitary, very short stalks. [A. C.]

AIDIA, Loureiro (from the Greek, ἀιδιας, "everlasting"). Everlasting Tree. *Pentandria Monogynia*, Linnæus; *Caprifoliaceæ*, Jussieu. Calyx tubular, five-toothed; corolla salver-shaped, the mouth woolly; anthers without filaments; summit of the pistil simple; berry one-seeded.—Spreng. Syst. Veg. I. 754.

1. Chinese Everlasting Tree (*A. Cochinchinensis*, Loureiro). A tree of Cochin China, with opposite, lance-shaped, entire smooth leaves, and with white flowers, in short axillary clusters. [A. C.]

AILANTUS, Desfontaines (from the Malay, *Ailanto*). Paradise Tree. *Polygamia Monœcia*, Linnæus; *Terebinthaceæ*, Jussieu; *Rutaceæ*, De Candolle. Calyx five-parted; corolla five petals; stamens two to three; pistils lateral; seed-organs three to five; fruit-keys one-seeded.—De Cand. Prod. II. 88.

1. Lofty Paradise Tree (*A. excelsa*, Roxburgh). An ornamental, evergreen, stove tree, fifty feet high, from the East Indies in 1800: leaves abruptly winged and saw-toothed; flowers whitish-yellow; propagated by cuttings. —Roxb. Cor. I. 23.

2. Glandulose Paradise Tree (*A. glandulosa*, Desfontaines). A hardy deciduous tree, twenty to sixty feet high, from China in 1751: leaves winged; leaflets with glandular teeth at the base; flowers, in August, green. *A. procera*, Salisbury. [A. C.]

AIPHANES, Humboldt. A generic name for *Euterpe Praga*, Sprengel. [A. C.]

AIR. As respects vegetable physiology, the air of the atmosphere is indispensable to vegetation in all its stages; and a plentiful supply of it is indispensable to vigorous growth. Seeds will not germinate in a perfect vacuum, as was experimentally shown, long ago, by Ray; nor will plants continue to vegetate if placed in vacuo, as was proved by the experiments of Mariotte. It is not even enough that the air has access merely to those parts of the plant which spring up above the surface of the soil. It must have access, likewise, to the roots; for plants will not thrive if the root is buried too deep in the earth; and hence it is that roots in general do not penetrate to a great depth, but rather creep along horizontally near the surface of the soil, and within reach of the access of air. [I. K.]

Water absorbed by the roots of plants contains in solution a variable quantity of atmospheric air; and it thus consequently introduces a certain quantity of oxygen and of nitrogen. The oxygen gas may also be furnished by the decomposition of the absorbed water; and from the same source, also, the quantity of hydrogen, free or combined, which exists in vegetable matters, may be derived. As to the nitrogen, though it is not generally considered as a portion of the usual constituents of plants, it cannot be denied that it often occurs. Thus when we draw the air from a plant by means of the air-pump, the first products obtained are apparently atmospheric air; but at last, the air drawn off is more strongly charged with nitrogen; and perhaps we ought to say, that the oxygen of the atmospheric air is combined with the plant, leaving the nitrogen free in certain air-cavities, otherwise we cannot consider it as part of the plant. It cannot at least be denied, that nitrogen is found in a combined state in cruciferous plants (turnips, cabbage, cress), in mushrooms, and in the glutinous principle of wheat, and many other immediate constituents of vegetables, such as indigo and the like. We see that it can be introduced into the plant, either with the atmospheric air, or by means of the soluble matter of animal origin, which the roots absorb on its mixing with carbonic acid, as we find frequently in nature, but first observed by Spallanzani and Senebier. This latter mode of the introduction of nitrogen is confirmed by the observation of Proust,

that green plants, meaning such as have decomposed carbonic acid gas, contain more of nitrogen than blanched plants. The air dissolved in the water, or mixed with it, which enters into a plant along with this water, is either carbonic acid, furnished to the leafy parts to be decomposed, or atmospheric air, of which a portion perhaps may enter, as a constituent part of the same tissue. It can also penetrate in many cases across the tissue itself of plants; such as when we find it impossible to impede its passage in all the experiments made upon living as well as upon woody stems. Whatever may be its origin, this atmospheric air, in whole or in part, and perhaps also a part of the carbonic acid, or of the portion of oxygen not disengaged by the surfaces of leaves, is found in the plant under two forms; first in the vessels, and secondly in the aerial cavities.

We had conceived for a length of time that these vessels were the conduits of the crude sap; but, on the contrary, it appears that their most ordinary state is to contain air. M. Bischoff appears to us to have put this assertion out of doubt (*De Vera Vasarum Spiralium Plantarum Structura et Indole*, 8vo., Bonnæ, 1829). He has remarked, first, that if we cut across, under water, the stem of a plant, and if we squeeze it with the fingers, we see small bubbles of air issuing from the bundles of vessels; secondly, that if we perform the same operation in the open air, we do not see any liquid go out; a double fact, which appears to demonstrate that the vessels enclose air. It sometimes happens that we find a little liquid at the orifice of the vessels, which is in consequence of this liquid often a little viscous, existing in the surrounding cellular tissue, and having been disengaged by the cutting instrument employed. We find this, in fact, only when the cellular tissue is very moist, and not when it is moderately so; besides, when the cut surface has been well wiped, no more liquid appears. M. Bischoff confirms these primary data, by observing, that if we cut neatly a stem a little moist, and examine it by the microscope, the orifice of the vessels appears empty; and, if we place upon it a drop of water, this is imbibed immediately, either into the cells, or into the vessels; but on examining the opposite extremity of the stem, we see the orifice of the vessels exhaling the small bubbles of air which appear to have been pushed thither by the water's entering at the other end.

On exposing the cutting of the stem of a melon under water to the action of the air pump, there was seen, at the first strokes of the piston, small bubbles of air going out from the ten packets of vessels which terminated at the horizontal cut, while the neighbouring cellular tissue would not allow a bubble to escape. This experiment is easily made, when tried upon plants whose vessels possess a large orifice. The air which escapes from these vessels is not carbonic acid gas; for, when we repeat these experiments under lime water, this is not rendered in the least turbid by its evolution; but what is the nature of this air?

M. Bischoff collected, under the receiver of an air pump, a certain quantity of air drawn from the vessels of a balsam, with the intention of analysing it; but in spite of his perseverance, the bubbles which were thus obtained were too minute to be submitted to the ordinary eudiometric processes. He repeatedly took bubbles of atmospheric air, and submitted them to the action of sulphate of potass during ten or fifteen minutes, measuring, by the weight of water displaced, how much the bubble diminished during this operation. He found, in often repeating these experiments, that he might conclude the diminution of atmospheric air to be in the proportion of twenty and a half to twenty-one and a half of oxygen gas. As this result deviates little from the reality, he has applied the same process to bubbles going out of the vessels, and he has found that there issues

From *Malva arborea*, 27·9 of oxygen.
From *Cucurbita Pepo*, 29·8 of oxygen.

After a series of many experiments, he concludes, that in general this air contains 8.5 of oxygen more than the atmospheric air. These experiments require such delicate management, that, in spite of our confidence in the observer, it is difficult not to have some doubt concerning the quantities; but we can safely conclude upon the whole:

First,—That the vessels of plants contain, in their ordinary state, not juices, but air.

Secondly,—That this air is a little richer in oxygen than the atmospheric air, and does not contain carbonic acid gas.

Now, from what source does this air of the vessels come, and what is its office? These two questions are difficult to discuss, much less to answer.

It is very probable that the air in the vessels comes, either from the air mixed with the water absorbed by the roots, or perhaps in part from that which the leaves absorb during the night; but as we do not know, at least precisely, the termination of the vessels neither when traced to the roots, nor to the leaves, we cannot form any correct idea of the manner in which the air can be carried thither. M. Bischoff thinks that the air is secreted by the roots, and not absorbed from without, as in respiration. We have no particular objection to this opinion; but we do not consider it by any means as demonstrated. M. Bischoff thinks, also, that this air, and especially the oxygen which it contains, acts upon the absorbed sap through the roots of the plants, and modifies it by rendering it suitable to their nourishment and to their growth.

According to this hypothesis, the vessels of plants will perform an analogous office to the air pipes (*tracheæ*) of insects, and respiration will be carried on in a similar manner by the passage of the air into the different parts of a body where the nourishing fluids may be deposited. The analogy of the form of these organs appears to authorise this suspicion; but farther than the analogy of form, there is no proof of this; and the facts themselves ought to be revised, multiplied, and varied. We may add, that if the office of the air in the vessels of plants is analogous to that of the air pipes in insects, we cannot suppose at least that it is owing to a secretion of the roots; so far at least we have no example of a respiration going on by secreted air, but always taking place by

the inhalation of atmospheric air. We should therefore be more inclined to suppose that this air comes from the atmospheric air absorbed from without, which, besides, would be mixed with a smaller portion of oxygen, derived from the decomposition of the carbonic acid gas of the sap.

Besides the air contained in the vessels, we find some also in certain cavities, produced either by the rupture of a part of the cellular tissue on the dilation of the intercellular passages, or by the general decomposition of certain parts which remain entire. To the first class appertain the cavities which are formed in the pith of the dicotyledonous plants, in the straw of the grasses, and of many water plants, in the leaf-stalks of *Trapa natans*, in the utricules of *Utricularia*, in the doubling of the pericarps of *Cysticapnos*, or of *Nigella Damascena*, and the like. To the second we ought to refer the cavities of the husks of the *Colutea*, of the *Cardiospermum*, and of all the vesicular fruits, those which are formed in the buds of some flowers by the swelling of the petals before their expansion, and the like. While these two classes of cavities may be very different in their origin, the little we know of the nature of the air which they inclose, does not separate them. In many cases, this air may be secreted by the plant, somewhat in the way that it appears to be disengaged in the intestines of animals, such as in the swim-bladders of fishes, and in tympany (*emphysema*). This secretion may be sufficiently evident, as in the leaf-stalks of *Trapa*, in the utricules of *Utricularia*, and the like. In other cases, it appears that the atmospheric air penetrates into the cavities of vegetables by the general porosity of the tissue. This we are disposed to consider as the case in pods, in capsules, and in the buds of flowers where we find air. M. Bérard (*Mém. sur la Nature des Fruits*, p. 18) also agrees in this opinion, observing that, when we press slightly and gradually a pod of *Colutea*, we force out all the air which it contained, without its being torn. It also appears, that this opinion coincides with the experiments of Dalton and of Berthollet, who proved with what facility these gases mutually mingle, in circumstances the most unfavourable to the phenomena.

The analyses which have been made of these gases enclosed in different cavities are few in number, and the results appear contradictory when we are not led to investigate the circumstances of the fact. Thus the experiments of Priestley (*Works*, III. p. 279), and of Bidault de Villiers (*Ann. de Chimie*, 88, p. 89), related in Thomson's Chemistry (IV. p. 245), give us very little information; but when we examine the circumstances, we find in reality they all give the same results. We have examined the air in the bladders of *Fucus vesiculosus* (*Bull. de la Soc. Philom. An.* VII. p. 171), of the pods of *Colutea arborescens*, of *Asclepias Syriaca*, and the like. In the one and in the other we found nothing but atmospheric air when these vesicles have been exposed for some time to the air. On the contrary, on plunging them for some time under water in the shade, we discovered a quantity of carbonic acid gas, and the longer the immersion was continued, the greater proportion of this was produced (*De Candolle, Astragal.* p. 15); and even at length the oxygen altogether disappeared. Ingenhouz, before this experiment, and M. Bérard afterwards, obtained analogous results. In these circumstances it is very probable that the oxygen of the air combines with the carbon of the interior surface of the vesicle, as is the case with the external surface of the outer bark, or of the root; but when we place vesicular pods under water exposed to the sun, the result is contrary to the preceding. Ingenhouz formerly remarked this, and M. Theodore de Saussure observed that the air in pea-pods, expressed immediately after they have been gathered, contains 19·3 of oxygen, 1·5 of carbonic acid, and 79·2 of nitrogen; while after their submersion under rain-water in the sun, the air contained 30 of oxygen, 1 of carbonic acid gas, and 69 of nitrogen.

In some instances these vesicles serve to sustain water-plants in the water like real swim-bladders, a circumstance very obvious in *Trapa utricularia*, *Lemna gibba*, and among the cryptogamous plants in the *Fucus natans*, *Fucus vesiculosus*, and the like. We can also suppose that in other aquatic plants the aerial cavities of the leaf-stalks on the flower-stalks of the *Nymphæa*, the stems of the *Ceratophyleæ*, of the *Naïdes*, and the like, tend to sustain them erect in the water. We can also say that the vesicles of flower-buds serve to protect the pollen against the action of water or of moisture. But of what service are the cavities of the pith, the hollow tubes (*lacunæ*) of the straws of grasses or the non-aquatic *Equiseta*, and the cavities of the vesicular pericarps? This question would be difficult to solve without entirely deranging the circle of observed facts.

With respect to the heat contained in the air of plants, Rumford and Leslie have fully proved that air does not transmit caloric from molecule to molecule, but only by the movement of heated molecules; that imprisoned air is the best envelope for preventing the passage of caloric, in consequence of enclosing it in the same way as our clothes prevent the escape of our animal heat. Consequently, the more vegetables are provided with superimposed layers, the more will they resist the influence of external temperature. It is thus that exogenous plants are less sensible to external temperature than endogenous ones, because the former are furnished with a bark and a great number of layers. Among exogenous plants, accordingly, those which possess a great number of outer barks ought to be able better to resist the cold; such is the birch, which, of all known trees, is the one found highest in the region of the Alps, and nearest the pole.

The scales which cover the buds and the coats (*tunicæ*) which cover the bulbs, are evidently intended to guard the young shoots by performing the office of proper garments for protecting them; and it is worthy of remark, that vegetables which are furnished with these, support a climate much more severe than analogous plants without them. The scales of buds, by reason of their more dry nature, are in this respect often more serviceable than the pulpy coats of bulbs. In some trees, which are destitute of the bud scales, such as the *Robinia pseud-Acacia*, the plane-tree, and the like, it is the leaf-stalk itself whose folded margins cover the bud, and shelter it from the cold and wet. The down which covers certain parts of some vegetables is also, in some cases, a defence against external temperature. We have little doubt that the down so abundant on certain tropical trees, serves as a protection against the burning heat of the sun's rays, and is of similar utility to the awnings with which we are accustomed to protect the trunks of very delicate trees. The down which is found in many buds, such as in the horse-chestnut, is cer-

tainly one means of preserving the young shoots from the cold, and in this case may be one of the causes by which this oriental tree is naturalized as far as the north of Europe. [F. D.]

AIR. In veterinary practice, a plentiful supply of pure air is no less essential to the health of our domesticated animals than to our own. The atmosphere being composed of twenty-one parts of oxygen, and ninety-eight of nitrogen, the animals which breathe it are destroyed by the total abstraction of the oxygen as effectually and rapidly as if breathing were completely prevented. We have daily proof that life may be supported in an atmosphere containing less than its due proportion of oxygen; but such a want, if long felt, is highly detrimental to the health of the unfortunate animals compelled to endure it. In the stable, the cowhouse, and the kennel, the want of a due proportion of oxygen is a fertile source of what is vaguely called want of condition; meaning thereby, a deviation from health, or, in a word, disease. The animal may have abundance of good food, and yet be lean, languishing, unfit for work, and oftentimes a disgrace to the owner, and all from not having a sufficiency of fresh air. In breathing, the air passes into the lungs; in a little time it is thrown out again; but it has undergone a change which the chemist discovers to consist in the loss of a portion of its oxygen, and the acquisition of another element, which is called carbonic acid gas. The air, besides, while it undergoes this change, at the same time produces a change on the blood in the lungs, which is thereby purified. Now as this purification is absolutely necessary to support life, and as the same air can purify the blood only once, what but disease, in some shape or other, can be expected when an animal, or a number of animals, are shut up and compelled to breathe a large portion at least of the same air again and again.

Those who are called thorough-bred grooms seem to regard fresh air in the stable as a strong poison; for not only do they close every door and window, but they industriously close up every little opening and cranny through which a breath of air may enter: even the keyhole, and the space at the bottom of the door, are viewed with suspicion, and, on a cold night, these also are stopped up. On opening the stable-door in the morning, the hot air, saturated with all manner of impurities, rushes forth, a rank and unwholesome compound of deleterious vapours. The eyes, and throat, and nostrils feel the acrid fumes loaded with ammonia; and we may well wonder if the horses do not feel it also, or how they can endure it at all. But could they complain, they would tell us that they feel it acutely enough, and endure it because they must; and that, too, by day as well as by night; for no sooner do they obtain a minute's relief by the opening of the stable door in the morning, than the groom begins to toss up the litter, and, as if on purpose to suffocate the animals with ammonia and carbonic acid gas, he thrusts the straw, saturated with urine, directly under the manger. There it lies reeking with acrimonious vapour, and exerting its baneful influence on the nose, the eyes, the lungs, the blood, and the whole body.

Let it not be supposed, that so very absurd a mode of treatment is harmless because a careless observer may perceive no immediate mischief. It in fact lays the foundation of many diseases, and is the sole cause of several, as we shall elsewhere show. The motive among stablemen for keeping a close, airless stable, is to keep it warm, that the horses' coats may be smooth and short. Cowkeepers say they do the same to prevent their cattle from catching cold. Warmth is no doubt congenial to all our domesticated animals; but it should never be forgotten that an apartment heated by the breath and the bodies of living animals, has its atmosphere poisoned; for as the air becomes heated it becomes foul, and is rendered unfit to sustain animal life. To keep animals warm then, and in health, it is necessary that the apartments be heated by fires, or some other means not dependent upon confinement of the air, as we shall fully explain under VENTILATION. [C. S.]

AIRA, Linnæus (from the Greek 'αἴρω, "I destroy"). Hair Grass. *Triandria Digynia*, Linnæus; *Gramineæ*, Jussieu. Spikelets two-flowered; husks two, membranaceous, and keeled; chaff two-valved, herbaceous, the lower awned, rarely awnless; seed-organ smooth and shining; pistils two, without styles, feathered; chaff-scales two, sharp; seed free, smooth, and shining.

I.

SPECIES OF AUTHORS.

1. Alpine Hair Grass (*A. alpina*, Linnæus). A perennial British grass, about one foot high, found on mountains in Scotland and Wales: leaves somewhat awl-shaped; panicle dense, rather erect; footstalks and branches perfectly smooth; florets equal to the husk; awn somewhat terminal, short.

2. Dark Purple Hair Grass (*A. atropurpurea*, Wahlenberg). From Lapland: leaves plane; panicle straggling, and as if starved; florets shorter than the husk, hairy at tip.

3. Silvery Hair Grass (*A. caryophyllea*, Linnæus). A British annual, four to six inches high, common on gravelly soils: flowers in May; panicle straggling and spreading; florets less than the husk; awn jointed, exceeding the husk; leaves bristle-like, short and few.

4. Danthonian Hair Grass (*A. danthonioides*, Trinius). An American grass, with the chaff exceeding the husk, unequally toothed on the back; the awn jointed, longer than the husk; leaves very narrow.

5. Elegant Hair Grass (*A. elegans*, Willdenow). An annual from Italy: leaves bristle-like; flowers sitting, the higher one awned, the lower one awnless; outer husk twice sword-pointed.

6. Wavy Hair Grass (*A. flexuosa*, Linnæus). A British perennial, one foot high, common on heaths: panicle spreading; florets scarcely higher than the husk; awn jointed, exceeding the husk; valves of the husk pointed.

7. Fenced Hair Grass (*A. involucrata*, Cavanilles). A Spanish annual: spikes awnless; panicle with whirled branches; lowest whirl barren.

8. Lagasca's Hair? Grass (*A? Lagascæ*, Kunth). An annual from Spain and Corsica: panicle hair-like, lax, three-forked, branchy, tapering to a narrow point; florets awnless, with the husks keeled and shorter.

9. Mountain Hair Grass (*A. montana*, Linnæus). A perennial of Lapland: leaves bristle-like; panicle narrow; florets hairy; awn at the base, very long, and twisted.

10. Early Hair Grass (*A. præcox*, Linnæus). A British annual, from one to three inches high, common on sandy pastures: flowers in May and June; panicle few-flowered, pale silvery green, somewhat spiked; florets scarcely velvety at the base, about as long as the husk; awn jointed, longer than the husk; leaves bristle-like.

11. Pretty Hair Grass (*A. pulchella*, Willdenow). An annual, six inches high, from Spain in 1820: panicle straggling; branches three-forked; florets somewhat in threes, greater than the husks; awn jointed, longer than the husk; leaves bristle-like; sheath-scale oblong, blunt.

II.

DOUBTFUL SPECIES.

12. Ægilopsian Hair Grass (*A. ægilopsoides*, Walter). From Carolina: awnless; spikes one-sided; chaff one-valved, egg-oblong, tapering to a point.

13. Silvery Hair Grass (*A. argentea*, Lowe). Found in the woods of Madeira: turfy; panicles closed, with whirled, rough branches, nodding at the summit; florets as long as the husk, hairy at the base; awned, somewhat on the back; leaves conduplicate, thread-shaped, flattish.

14. Short-leaved Hair Grass (*A. brevifolia*, Pursh). A perennial found on the banks of the Missouri: panicle half-whirled, spreading; branches rather simple, alternate flowered; flowers awnless, as long as the husk; straw straight, smooth, rather naked.

15. Capillaceous Hair Grass (*A. capillacea*, Lamarck). A North American perennial: panicle capillaceous, effused; florets awnless, longer than the husk; leaves narrow, smooth, short; straw erect.

16. Chinese Hair Grass (*A. Chinensis*, Retzius). A Chinese grass: leaves bristle-like; panicle erect; florets awned, velvety.—Retz. Obs. III. 10.

17. Stiffish Hair Grass (*A. duriuscula*, Poiret). Turfy; straw rigid, low; leaves short, awl-shaped, somewhat rolled up; panicle spreading; flowers awned.

18. Festucan Hair Grass (*A. festucoides*, Villars). A perennial of Dauphiné: leaves thread-shaped, slender; panicle erect; flowers coloured, awned beyond the middle.

19. Filiform Hair Grass (*A. filiformis*, Koenig). An East Indian grass, one foot high: smooth, erect; leaves sword-shaped; panicles oblong, compounded of simple, line-like branches on one side.

20. Smooth Hair Grass (*A glabra*, Brotero). An annual grass of Portugal: leaves plane; panicle lax, spreading; foot-stalks smooth; awn beneath the tip of the floret bent back.

21. Maggot Hair Grass (*A. lendigera*, Lagasca). A Spanish annual: panicle three-forked, branchy, straggling; chaff awned beneath the summit; awn longer; leaves line-like, bristle-like, smooth.

22. Many-stemmed Hair Grass (*A. multicaulis*, Dumortier). A grass found near the Rhine: dense, turfy; straws simple; panicle narrow; florets shorter than the chaff.—Dumortier, Agrost. Tent. 121, Tab. 7.

23. Shining Hair Grass (*A. nitida*, Sprengel). A grass of Pennsylvania; awnless; panicle narrow, cylindrical; husks abrupt.—Sprengel, Mant. I. 32.

24. Pale Hair Grass (*A. pallescens*, Kitaibel). A Hungarian grass: panicle lax, narrow; spikes somewhat three-flowered, wedge-shaped; straws erect.

25. Gravel Hair Grass (*A. Sabulonum*, Labillardiere). A grass of New Caledonia: florets awnless, tapering to a point; panicle erect; leaves rolled up.—Labill. Nov. Caled. 16. Tab. 21.

26. Bristle Hair Grass (*A. setacea*, Retzius). A European grass: leaves bristle-like; panicle diffuse; florets hairy at the base, the lower awnless, the upper with a short awn.

27. Three-flowered Hair Grass (*A. subtriflora*, Lagasca). A Spanish perennial: panicle erect, rather crowded; husks for the most part three-flowered; chaff hairy at the base, awned beneath the middle; awn straight, somewhat equal to the flowers; leaves awl-shaped, straight.

28. Slender Hair Grass (*A. tenera*, Kitaibel). An annual of Sclavonia: panicle spreading; florets smooth, longer than the husks; leaves plane; straw erect.

29. Slenderest Hair Grass (*A. tenuissima*, Sprengel). An American grass: panicles conical, very branchy; branches waved, hair-like; leaves rolled up, longish, and with smooth leaf-sheaths.

30. Three-awned Hair Grass (*A triaristata*, Clarke). A grass of Palestine; panicle spike-formed, oblong; chaff of the husk furrowed, velvety; outer valve of the chaff three-awned; leaf-sheaths bellying, very full.

31. Changing Hair Grass (*A. versicolor*, Roemer). Found in the Falkland Islands: leaves bristle-like; straw leaf-sheathed, leafy; panicle somewhat narrow; foot-stalks hair-like, waved, twisted. [M. K.]

AIR CELLS. In vegetable physiology, are cavities in plants containing air, as in the hollow stems of grasses, and some bulbous plants, the cells in the pith of the rush, but particularly cells in the leaves and other parts communicating with the external pores (*stomata*), and very variable in size, figure, and arrangement. We are indebted to the recent experiments of M. Dutrochet for more precise notions respecting these cells, which he investigated when inquiring into the sleep of plants, as we shall detail under that head. [B. E.]

AIR CELLS. In veterinary anatomy, will be noticed under LUNGS. [C. S.]

AIRING. In stable management, will be noticed under EXERCISE. [C. S.]

AIROCHLOÆ, Link. A term applied to the awnless division of *Koeleria*, Persoon.

AIROPSIS, Desvaux (from the Greek '*αιρα*, "hair grass," and '*οψις*, "like"). Lock Grass. *Triandria Digynia*, Linnæus; *Gramineæ*, Jussieu. Spikelets two-flowered, both fertile; husk two-valved, somewhat equal and awnless; chaff two-valved, translucent; anthers egg-oblong and cleft; seed-organ smooth and shining; summits of the pistils feathery; chaff-scales two.

1. Agrostidean Lock Grass (*A. agrostidea*, De Candolle). A perennial found in France and Spain: spikes two-flowered, somewhat abrupt; panicle lax; chaff slender, membranaceous, smooth, straw at the base, knee-jointed or rooting.—De Cand. Icon. I.

2. Golden Lock Grass (*A. aurea*, Nees Von Esenbeck). A perennial found at the Cape of Good Hope: panicle straight; branches in pairs, somewhat three-forked; spikes egg-oblong; lower valve of the florets ribbed, silky, with leaf-sheaths and leaves woolly above the margin.

3. Globose Lock Grass (*A. globosa*, Desvaux). A perennial, one foot high, from France in 1826: straw erect, thread-shaped; leaves rolled inwards, somewhat awl-shaped; panicle straight. *Aira globosa*, Thore in Journ. de Bot. 1, 197, Tab. 7, f. 3·4, and 2·208.

4. Stendel's Lock Grass (*A. Stendelii*, Nees Von Esenbeck). A perennial found at the Cape of Good Hope: panicles with short three-forked branches, few-flowered; spikes oblong; leaves rolled up, bristle-like, smooth. [M. K.]

AIR PASSAGES. In veterinary anatomy, the tubes which the air traverses. These are the nostrils, the windpipe, and its branchings; or, in the language of anatomists, the nostrils, the larynx, the trachea, and the bronchia. They are lined, from their commencement to their termination, by a delicate vascular membrane, which pours forth a mucous fluid, in sufficient quantity to defend them from the action of the air. Of the diseases of the air passages, we shall treat under CATARRH, ŒZENA, GLANDERS, CATARRHAL FEVER, ROARING, LARYNGITIS, and BRONCHITIS. [C. S.]

AIR PLANTS. This term is given to such plants as can live suspended in the air without their roots being inserted into any sort of soil, as is the case with other plants. These air plants are chiefly orchideous parasites, and one or two species of *Tillandsia*, and are all natives of tropical climates, where much shade and much moisture prevails; such as the wooded banks of streams, overhanging mossy rocks, with water trickling down their sides, beneath cataracts, and shady forests. Most of these air plants are not only curious, but have very fragrant flowers of great beauty; and hence it has long been the endeavour of our enterprising gardeners to cultivate them here as is done in China and India. At first, success in this was rare, from ignorance of the proper management; but recently, instances have not been wanting of bringing air plants to blossom successfully in our stoves. We have seen them thriving at Kew, where they were grown in rough tanner's bark, well pressed in small baskets hanging on the wall of the stove. Loddige, and others, have more closely imitated their natural growth, by establishing them on the trunks of hothouse palms.

Our scientific correspondent, the Hon. and Rev. W. Herbert, in an early volume of the "Horticultural Transactions," says, "I am informed, by a friend at Calcutta, that he cultivated, with great ease, all the *Dendrobia*, *Aërides*, and other parasitical plants, by tying them, with twine, to the stem of a tree, or to the under-side of a branch, and placing above them a pot of water, with a hole at the bottom, through which a string passed, nearly as large as the aperture, by which the water was gradually and continually conducted to the upper part of the parasitical plant, which requires to be constantly moist and shaded; and that a tree with smooth bark answers the purpose best. He mentions that *Dendrobium Pieradii*, fastened to a tree and irrigated in this manner, will, in little more than a year's time, produce pendulous racemes of flowers, from two to six feet long; and it appears likely to thrive with me under the same treatment. I had previously found no difficulty in establishing *Epidendra* on the stems of trees in the stove, by cutting a notch in the bark and inserting the plant like a graft, and tying moss about it to support it till the young roots had attached themselves to the bark; but from want of sufficient moisture they have not made much progress, or flowered with me. I have now adopted the above-mentioned mode of irrigating them, with full confidence that it will succeed in our stoves, as well as it does at Calcutta; and very soon after its application to a sickly *Epidendron*, growing on the stem of *Sterculia Balanghas*, vigorous young fibres began to sprout from it on all sides. I am very much inclined to think that most of such plants would attach themselves to the sides of a porous stone or vessel, or of a dead root, if constantly irrigated, and thrive upon them as well as upon a living tree, especially if the stone or root were covered with growing moss; for I have observed the fibres of more than one sort attach themselves strongly to the outside of the pot in which they are planted; and I conceive that they might be beautifully cultivated upon an ornamental cone of porous pottery, filled with water, and furnished, on the outside, with nitches, in which the plants might be fixed, with a little moss or peat to promote their growth in the first instance.

"I have found the parasitical plants," continues Mr. Herbert, "in danger of perishing, from want of moisture, on a deciduous tree, during its season of inactivity; but that deficiency would probably be removed by constant irrigation. The neatest and most convenient vessels for that purpose, perhaps, would be little tubs, such as are sold at toy-shops, which might be easily tied to a branch, and perforated with a small gimblet. A short string, of which one end is twisted, or at least in contact with the plant, and the other inserted into a phial of water, will also be found to convey a regular, though less plentiful supply of moisture, acting in manner of a siphon. I have used it advantageously to nourish a graft, and promote its union with the stock. For the cultivation of parasitical plants in pots, I recommend placing the pots on a back flue, in a tin tray, about two inches deep, and half filled with wet sand, giving an abundant supply of water, but not sufficient to produce rottenness by its stagnation. I find the growth of crinums, which also like a moist peat, to be prodigiously rapid with that treatment. I should suggest a mixture of porous stones, or bits of broken pots, with old tan, or such peat as contains a portion of half-decayed wood, and a garnish of moss to the pot, as preferable, for parasitical plants, to the loam which some of our books have recommended."

Dr. Lindley has lately published in the new series of the *Hort. Trans.* and the *Botanical Register*, some very excellent directions for the cultivation of air plants. The conditions, he says, under which they best thrive, are a high temperature, diffused light, like that of a shady grove, and not direct solar light; a great degree of dampness, and a perfect freedom from stagnant water round their roots; for on the trunks of trees or on stones and rocks, no water can lodge, and all the moisture they receive must necessarily be in the form of vapour or of falling rain, and it is to circumstances of this nature that the gardener has chiefly to attend. Damp, shade, heat, and good drainage will be his objects: the three former will cause him no trouble, but the latter will require him to alter entirely his usual mode of cultivation. Instead of considering in what kind of soil his air plants are to be placed, he will endeavour to dispense with soil, and to supply its place with bits of rotten wood, chopped moss in very small quantities, fragments of half-baked pottery, such as garden-pots and the like. But equal importance to all of them is a circumstance of which gardeners are only just beginning to be aware; namely, that air plants, and all other tropical plants, require a season of repose and cessation from vigorous growth. If a gardener were to be told that he ought to keep his vines or his peaches growing incessantly, without any season of rest, he would consider his adviser either a madman or an ignorant pretender; and yet he himself commits the same capital error with his hothouse and greenhouse plants. He is always endeavouring to maintain the perpetual spring of the poets; and he wonders that his plants are sickly and barren. This arises from misunderstanding the well-known fact, that there is no winter in hot countries. It is true that in equatorial regions there is neither frost nor snow, and that in many climates there is no cold season; but it does not, therefore, follow, that plants have no season of repose. The fact is, that within the tropics, or in those latitudes where frost and snow and periodical cold are unknown, the season of rest is the dry season. This it is to which the gardener should attend. It is this which explains

the difference between the success of one cultivator and another; and it is to a knowledge of this, taken in conjunction with the circumstances before explained, that we owe the remarkable improvement that has taken place in the mode of cultivating these plants in Great Britain. Thus far Dr. Lindley; and we cannot recommend his observations too strongly to our readers. [B. E.]

AIRSHIRE, in rural statistics. See AYRSHIRE.

AIR VESSELS. In vegetable anatomy and physiology, is a term which has been variously applied by different authors. Dr. Darwin describes air vessels to be horizontal, and of large diameter, passing through the bark of trees to the alburnum. Later writers are disposed to consider the fine spiral organs of the interior parts of plants as air vessels; and Link terms them air pipes, or wind pipes (*tracheæ*). This opinion, however, is by no means proved. Du Hamel, upon their structure appearing similar to the rings of the wind-pipe, supposed that they convey air, although he found sap in them during autumn. Hill says they contain a limpid fluid at Midsummer, and in autumn, but at other seasons are empty. Reichel proved, by growing plants in coloured fluids, that the spiral vessels exist in every part except the bark and the pith; everywhere conveying nutritive matter, and not air. Hedwig in some measure combines the above conflicting opinions, by describing a spiral vessel as composed of a membranous canal for conveying air, and a spiral tube rolled round it for conveying fluids. Mirbel and De Candolle seem to support the notion of Du Hamel, that the spiral vessels are air tubes. Treviranus and Bernhardi distinguish several sorts of these spiral vessels, which may probably serve different purposes. [B. E.]

AITONIA, Linnæus, Jun. (named from W. Aiton, of Kew Gardens). Aiton's Flower. *Monadelphia Octandria*, Linnæus; *Meliaceæ*, Jussieu. The calyx is deeply four-parted; the corolla has four petals; stamens eight, projecting; one pistil with a blunt summit; berry dry, with one cell and many seeds.

1. Cape Aiton's Flower (*A. Capensis*, Linnæus, Jun.). A pretty, ornamental, frame shrub, two feet high, from the Cape of Good Hope in 1777: the leaves in alternate fascicles; flowers, from April to September, pink, solitary, and on foot-stalks; propagated by cuttings in rich soil.—Bot. Mag. 178. [B. E.]

AITS. Small islands in rivers or brooks, often covered with osiers, and then termed osier aits.

AIZOON, Linnæus (from the Greek ἀεί, "ever," and ζωον, "living"). Ever-living. *Icosandria Pentagynia*, Linnæus; *Ficoideæ*, Jussieu. The calyx is five-parted and persistent; there is no corolla; the stamens are about fifteen, in groups of threes; pistils five; capsule five-angled, with five cells and five valves.

I.

SHRUBS.

1. Shrubby Ever-living (*A. fruticosum*, Linnæus). A shrub of the Cape of Good Hope: stem erect, branched; branches twiggy; leaves lance-shaped, narrowing at the base; flowers without flower-stalks; propagated by cuttings.

2. Perfoliate Ever-living (*A. perfoliatum*, Linnæus). An ornamental, evergreen shrub, one foot high, from the Cape of Good Hope in 1818: stem erect, branched, velvety; leaves inversely egg-oblong, perfoliate; flowers, from June to August, pink, on axillary, solitary stalks; propagated by cuttings in rich soil.

3. Stiff Ever-living (*A. rigidum*, Linnæus, Jun.) A shrub of the Cape of Good Hope: stem lying down; branches spreading; leaves inversely egg-oblong, rather pointed, sea-green, velvety; flowers alternate, without footstalks, arranged on one side only; propagated by cuttings.

4. Starred Ever-living (*A. stellatum*, Lamarck). A shrub of the Cape of Good Hope: stem spreading; leaves spatula-line-like; flowers in star-like panicles; stamens about twenty; calyx yellowish within.

5. Cottony Ever-living (*A. tomentosum*, Lamarck). A perennial of the Cape of Good Hope: stem shrubby, cottony, branched; leaves line-line, lance-shaped, narrow at the base, spatula-shaped at the tip; flowers sitting; calyx yellow within, four, rarely five-lobed; stamens fifteen; propagated by cuttings.

II.

HERBS.

6. Canary Ever-living (*A. Canariense*, Linnæus). An ornamental frame annual, one foot high, from the Canaries in 1731: leaves egg-oblong, wedge-shaped; flowers, in July and August, yellow, without foot-stalks; propagated by seeds in rich soil. *Glinus crystallinus*, Forskal.—Bot. Rep. 201.

7. Hairy Ever-living (*A. glinoides*, Linnæus). An ornamental, evergreen, frame plant, one foot high, from the Cape of Good Hope in 1774: the leaves wedged, roundish, and hairy; flowers, in June and July, yellow, without foot-stalks; the calyx hairy; propagated by cuttings in rich soil.

8. Spanish Ever-living (*A. Hispanicum*, Linnæus). An ornamental frame annual, nine inches high, from Spain in 1728: the leaves spear-shaped; flowers, in July and August, without petals and without foot-stalks; propagated by seeds in rich soil.—De Cand. Pl. 30.

9. Spear Ever-living (*A. lanceolatum*, Murray). An ornamental frame biennial, nine inches high, from the Cape of Good Hope in 1752: the leaves spear-shaped; flowers, in August, pink, in panicles; propagated by seeds in rich soil.

10. Panicled Ever-living (*A. paniculatum*, Linnæus). A native of the Cape of Good Hope, supposed to be the same as the *A. lanceolatum* of Murray.

11. Runner Ever-living (*A. sarmentosum*, Linnæus). A native of the Cape of Good Hope: stem spreading, producing runners (*sarmenta*); leaves line-like, rounded, smooth; flowers on solitary foot-stalks; propagated by offsets.

12. One-sided Ever-living (*A. secundum*, Linnæus). A native of the Cape of Good Hope: stem lying down; leaves inversely egg-oblong, pointed; flowers stalkless, axillary, arranged on one side only. [G. L.]

AJACIS. A specific name of a common species of larkspur (*Delphinium*), in the corolla of which it is fancied the word "Ajax," is inscribed. [O. B.]

AJUGA, Linnæus (from the Greek, α, privative, and ζυγων, "a yoke"). Bugle. *Didynamia Gymno-*

spermia, Linnæus; *Labiatæ*, Jussieu. Calyx egg-oblong, nearly equal, five-cleft; corolla with the tube exserted; upper lip erect, short, entire; lower one larger, spreading, three-parted; stamens longer than the upper lip.

1. Alpine Bugle (*A. alpina*, Linnæus). A British ornamental, deciduous perennial, six inches high: stem simple; stem-leaves as long as the root-leaves; flowers, in May and July, blue, in rather distant whirls; propagated by division in common soil.—Eng. Bot. 477.

2. Southern Bugle (*A. australis*, R. Brown). An ornamental, deciduous perennial, six inches high, from New Holland in 1822: stem simple; root-leaves oblong, waved, toothed, on long foot-stalks; flowers, in May and July, blue, without flower-stalks; propagated by division in sandy loam.

3. Ground Pine (*A. Chamæpitys*, Schreber). A pretty British annual, six inches high: stem diffuse; leaves three-parted; flowers, in April and July, yellow, axillary, solitary, shorter than the leaf; propagated by seeds in sandy loam. —Eng. Bot. 77.

4. Grecian Bugle (*A. Chia*, Smith). A hardy annual, from the Levant in 1828: stem spreading; leaves three-parted, rather hairy; flowers, from April till July, yellow; axillary, longer than the leaf. —Til. Flor. Græc., F. 524.

5. Decumbent Bugle (*A. decumbens*, Thunberg). A native of Japan: stem lying down, covered with long, loose hair; leaves inversely egg-oblong, toothed; flowers in whirls.

6. Leafy Bugle (*A. foliosa*, Trattinik). An ornamental, deciduous perennial, six inches high, from Switzerland in 1826: flowers, in May and July, blue; propagated by division in sandy loam.

7. Geneva Bugle (*A. Genevensis*, Linnæus). An ornamental, deciduous perennial, six inches high, from Switzerland in 1656: root-leaves smaller than the stem-leaves; flowers, in May and June, blush-red; propagated by division in common soil.—Bul. Her., 361.

8. Entire-leaved Bugle (*A. integrifolia*, D. Don). An ornamental, deciduous perennial, six inches high, from Nepal in 1821: very hairy; stem erect; lower-leaves spatula-oblong, waved, notched, narrowing towards the leaf-stalk; flowers, in July and August, blue, in ten-flowered whirls; propagated by division in sandy loam.

9. Musky Bugle (*A. Iva*, Schreber). A curious annual, six inches high, from the south of Europe in 1759: leaves line-like, toothed forwards; flowers, in July and August, yellow, axillary, solitary; propagated by seeds in sandy loam. *A. moschata*, Schreber; *A. pseudo-iva*, De Candolle.—Flor. Græc., 525.

10. Lobed Bugle (*A. lobata*, D. Don). A native of Nepal: leaves on long stalks, heart-shaped, blunt, cut-lobed; flowers in whirled spikes, arranged on one side only; the pieces of the calyx line-like, lance-shaped, pointed, shorter than the flower-scales.

11. Oblong-leaved Bugle (*A. oblongata*, Sprengel). A hardy perennial, from the Caucasus in 1829: stem rising, branched; leaves oblong, bluntish, entire; calyx shorter than the tube of the corolla; flowers, from May till June, blue. *A. salicifolia*, Stevens.

12. Oriental Bugle (*A. orientalis*, Linnæus). An ornamental, deciduous perennial, one foot and a half high, from the Levant in 1732: stem erect, covered with long loose hairs; leaves egg-oblong; flowers, in May and June, blue; corolla downy, inverted; propagated by division in sandy peat. Dill. Elth., T. 53, f. 61.

13. Pyramidal Bugle (*A. pyramidalis*, Linnæus). A British ornamental, deciduous perennial, three inches high: root-leaves very large, inversely egg-oblong, notched; flowers, in May and June, purple, in four-cornered, pyramidal, velvety whirls; propagated by division in sandy peat.—Eng. Bot. 1270.

14. Common Bugle (*A. reptans*, Linnæus). A British ornamental, deciduous perennial, six inches high: stem erect; leaves egg-oblong; flowers, in May and June, blue, in whirls; propagated by division in sandy peat.—Eng. Bot., 489.

Var. a. A. alba. A British ornamental perennial, six inches high: flowers, in May and June, white.

Var. b. A. cærulea. A British ornamental perennial: flowers blue.

Var. c. A. rubra. A British ornamental, deciduous perennial six inches high: flowers, in May and June, red.

15. Rock Bugle (*A. rupestris*, Schleicher). An ornamental, deciduous perennial, six inches high, from Switzerland in 1826: flowers, in June and July, blue; propagated by division in sandy loam.

16. Willow-leaved Bugle (*A. salicifolia*, Smith). A hardy annual, from the Levant in 1828: flowers, in April and July, yellow.—Flor. Græc., T. 526.

17. Wavy Bugle (*A. sinuata*, R. Brown). A native of New Holland: stem lying down, hairy; leaves all oblong, wavy, narrowing at the base; corolla rather hairy; calyx very hairy.

18. Tenore's Bugle (*A. Tenorii*, Presl). A native of Sicily: stem low, covered with long loose hairs; leaves oblong, angular-toothed; flowers axillary, crowded. [Q. R.]

AJUGOIDEÆ, Bentham, a division of LABIATÆ, comprehending *Leucosceptrum*, *Teucrium*, *Amethystea*, *Trichostema*, *Ajuga*, and *Ansomeles*.

AKEE TREE (*Blighia sapida*, Aiton). An African fruit tree, bearing a sort of reddish or yellowish apple, as large as a goose's egg, which is cultivated for its fruit in the West Indies. It can only be raised here in the stove by cuttings. [B. E.]

AKEESIA, Tussac (from the African word, *Akee*). A generic term for Blighia.

AKENIUM, or *Achenium*. A simple pip (*Nux*, Linnæus; *Thecidium*, Mirbel), as in the seeds of the thistle and of the sun-flower. [B. E.]

ALA (Latin). A wing, applied to several parts of various species of plants on account of resemblance, as in leaf-stalks; in the lateral petals of papilionaceous or pea-blossomed flowers; and the membranaceous borders of seeds, as in the ash and the sycamore. [B. E.]

ALABASTER. A variety of gypsum which can be worked into ornaments. It is a sulphate of lime, and the refuse of an alabaster work may be used as a manure for clover, &c. See GYPSUM. [B. E.]

ALABASTUS. Applied to the flower when in the state of a bud; probably because Pliny so designated the rose-bud. [A. C.]

ALACOSPERNUM, Necker. A genus now united to *Cryptotænia* of De Candolle. [A. C.]

ALAMANIA, Laxarsa. Laxarsa's Parasite. *Gynandria Monandria*, Linnæus; *Orchideæ*, Jussieu. Calyx six-parted and ribbed; liplet (*labellum*) glandular at the base; column having three points.—Annales des Scien. Nat. III. p. 452.

1. Mexican Laxarsa's Parasite (*A. punicea*, Laxarsa). A parasitical herb of Mexico, with a spike-bearing flower-stem, and red flowers. [A. C.]

ALANDINA, Necker. The genus *Moringa*, Burmann. [A. C.]

ALANGIÆ, De Candolle (from the Malabaric, *Alangi*). An order of the *Melastomaceæ Incertæ* of De Candolle, containing the genus *Alangium* only. [B. E.]

ALANGIUM, Jussieu (in Malabaric *Alangi*). Alangi Tree. *Icosandria Monogynia*, Linnæus; *Myrtaceæ*, Jussieu. Calyx five to six-toothed; petals line-like, six to ten; berry coated, one to three-seeded, crowned by the teeth of the calyx; leaves alternate.

1. Ten-petaled Alangi Tree (*A. decapetalum*, Lamarck). A bark-stove evergreen tree, ten feet high, from Malabar in 1779: branches smooth and hairy; leaves oblong, lance-shaped; flowers ten-petaled, whitish, smelling fragrant, solitary, or two to three in the arm-pits of the leaves; palish purple; berry somewhat cottony, two to three seeded; stamens twenty; propagated by cuttings in peaty loam.—*Grewia salvifolia*, Linnæus.—R. Mal. 4, 17.

2. Six-petaled Alangi Tree (*A. hexapetalum*, Lamarck). A bark-stove evergreen tree, fifteen feet high, from the East Indies in 1823: branches smooth, thorny; leaves egg-oblong, lance-shaped, pointed; flowers six to seven petaled, purple; stamens four times as many as the petals; berry with a cottony, leathery, purple bark; pulp red, viscous; nut one-seeded; juice sourish; propagated by cuttings in peaty loam.—R. Mal. IV. 26.

3. Cottony Alangi Tree (*A. tomentosum*, Lamarck). A small tree, from the East Indies: younger branches unarmed, leaves oblong, bluntly pointed, with velvety stalks and ribs, and small netted veins underneath; berry downy, bark leathery, somewhat woody, pale purple. [Q. R.]

ALATED (in Latin, *Alatus*). Winged. Applied to the stems of plants which have their edges membranaceous.

ALATERNUS. The common name of the *Rhamnus Alaternus*, of Linnæus. [A. C.]

ALBERTINIA, Sprengel (named in honour of Albertini, a writer upon Fungi). Albertini's Tree. *Syngenesia*, *Eupatorinæ*, Linnæus. Florets perfect, tubular; tuft (*anthodium*) hemispherical, one-leaved, with two series of scales; receptacle bristly; down (*pappus*) bristly.

1. Brazil Albertini's Tree (*A. Brasiliensis*, Sprengel). A small tree of Brazil: leaves alternate, stalked, oblong, rough, with stiff hairs beneath; flowers in bunches. [A. C.]

ALBESCENT (in Latin, *Albescens*). Whitish, or becoming white; applied to plants.

ALBIDUS (Latin). Whitish, or dusky white; applied to plants.

ALBUCA, Willdenow (from the Latin, *Albus*, "white"). White Flower. *Hexandria Monogynia*, Linnæus; *Asphodeleæ*, Jussieu. Calyx with six leaves, joining at the base, outer ones spreading, generally with a green stripe at the back; pistil with the style three-cornered; seeds flat.

1. Abyssinian White Flower (*A. Abyssinica*, Jacquin). An ornamental, greenhouse, bulbous-rooted perennial, two feet high, from Abyssinia in 1818: leaves line-like, lance-shaped, channelled, upright; flowers, in August, white; flower-stalks spreading as long as the nodding flower; inner calyx leaves vaulted at the end; propagated by offsets in rich mould.

2. Tall White Flower (*A. altissima*, Jacquin). An ornamental, bulbous-rooted, greenhouse perennial, four feet high, from the Cape of Good Hope in 1789: leaves awl-shaped, channelled, recurved; flowers, in April and May, white; inner leaves of the calyx glandular, bent in at the end; propagated by offsets in rich mould.—Jacq. Ic. I. 36.

3. Golden White Flower (*A. aurea*, Jacquin). An ornamental bulbous-rooted greenhouse perennial, eighteen inches high, from the Cape of Good Hope in 1818: leaves flat, line-like, lance-shaped; flower-stalks very long, upright, spreading; inner calyx leaves glandular, bent in at the end; flowers, in May and July, upright, greenish-yellow; propagated by offsets in rich mould.

4. Tailed White Flower (*A. caudata*, Jacquin). An ornamental, bulbous-rooted, greenhouse perennial, two feet high, from the Cape of Good Hope in 1791: leaves line-like, lance-shaped, rolled together, upright shorter than the flower-stalk; inner calyx leaves glandular, bent in at the end; flowers, in May and July, white; propagated by offsets in rich mould.—Jac. Ic. II. T. 442.

5. Channel-leaved White Flower (*A. coarctata*, Dryander). An ornamental, bulbous-rooted greenhouse perennial, two feet high, from the Cape of Good Hope in 1774: leaves smooth; flower-stalks as long as the flower-scales; inner calyx leaves vaulted at the ends; flowers, in May and June, yellow; propagated by offsets in rich mould.

6. Adder's Skin White Flower (*A. exuviata*, Curtis). An ornamental, bulbous-rooted, greenhouse perennial, one foot high, from the Cape of Good Hope in 1795: leaves line-like, awl-shaped, channelled; flower-stalk simple, shorter than the leaves; scales of the root wrinkled across; flowers, May and July, white; propagated by offsets in rich mould. *Anthericum exuviatum*, Jacquin.—Bot. Mag. 871.

7. Peaked White Flower (*A. fastigiata*, Dryander). An ornamental, bulbous-rooted greenhouse perennial, eighteen inches high, from the Cape of Good Hope in 1774: leaves line-like, flattish; flower-stem shorter than the leaves; flower-stalks very long, spreading; inner calyx leaves vaulted at the end; flowers, in May and June, white; propagated by offsets in rich mould.—Bot. Rep. 450.

8. Thread-leaved White Flower (*A. filifolia*, Ker). An ornamental, bulbous-rooted, greenhouse perennial, six inches high, from the Cape of Good Hope in 1820; flowers, in May and July, white; propagated by offsets in rich soil.

9. Flaccid White Flower (*A. flaccida*, Jacquin). An ornamental, bulbous-rooted, greenhouse perennial, two feet high, from the Cape of Good Hope in 1791: leaves line-like, lance-shaped, bent obliquely; flower-stalks spreading, at right angles; inner calyx leaves glandular, bent in at the end; flowers, in May and June, yellowish-white; propagated by off-sets in rich mould.—Jacq. Ic. II. T. 144.

10. Fragrant White Flower (*A. fragrans*, Jacquin). An ornamental, bulbous-rooted, greenhouse perennial, one foot high, from the Cape of Good Hope in 1779: leaves line-like, lance-shaped, channelled; flower-stalks spreading as long as the nodding flower; flowers, in June and July, yellowish-green; propagated by offsets in sandy peat.—Jacq. Schœn. I. T. 81.

11. Fleeting White Flower (*A. fugax*, Ker). An ornamental, bulbous-rooted, greenhouse perennial, one foot high, from the Cape of Good Hope in 1791: flowers, in May and July, yellowish-green; propagated by offsets in rich mould. *Anthericum fragrans*, Jacquin.—Bot. Reg. 311.

12. Greater White Flower (*A. major*, Dryander). An ornamental, bulbous-rooted, greenhouse perennial, three feet high, from the Cape of Good Hope in 1759: leaves line-like, lance-shaped, flat, bent back; flower-stalks spreading; inner calyx leaves glandular, bent in at the end; flowers, in April and May, greenish-yellow; propagated by offsets in rich mould.—Bot. Mag. 804.

13. Lesser White Flower (*A. minor*, Linnæus). An ornamental, bulbous-rooted, greenhouse perennial, one foot high, from the Cape of Good Hope in 1768: leaves line-like, channelled, smooth, awl-shaped; flower-stem upright;

inner calyx leaves glandular, bent in at the end; flowers, in May and June, yellow, nodding; propagated by offsets in sandy loam.—Bot. Mag. 720.

14. Dingy White Flower (*A. physodes*, Sims). An ornamental, bulbous-rooted, greenhouse perennial, nine inches high, from the Cape of Good Hope in 1804: leaves lance-shaped; filaments glandular at the base; flowers, in June and July, white, in pyramidal bunches before the leaves; propagated by offsets in rich mould.—Bot. Mag. 1046.

15. Bristly White Flower (*A. setosa*, Jacquin). An ornamental, bulbous-rooted, greenhouse perennial, one foot high, from the Cape of Good Hope in 1795: leaves line-like, lance-shaped, flattish; flower-stalks at right angles; inner calyx leaves glandular, bent back at the end; flowers, in May and July, upright, green; propagated by offsets in rich mould.—Bot. Mag. 1481.

16. Spiral-leaved White Flower (*A. spiralis*, Linnæus). An ornamental, bulbous-rooted, greenhouse perennial, nine inches high, from the Cape of Good Hope in 1795: leaves line-like, awl-shaped, rolled together at the end, spirally twisted, velvety; inner calyx leaves vaulted at the end; flowers, in June, white; propagated by offsets in sandy peat.—Jacq. Ic. II. T. 439.

17. Green White Flower (*A. viridiflora*, Jacquin). An ornamental, bulbous-rooted greenhouse perennial, one foot high, from the Cape of Good Hope in 1794: leaves line-like, awl-shaped, channelled, outside hairy; flower-stem upright, wavy; inner calyx leaves vaulted at the end; flowers, in June and July, green, nodding; propagated by offsets in rich mould.—Bot. Mag. 1656.

18. Clammy-leaved White Flower (*A. viscosa*, Linnæus). An ornamental, bulbous-rooted, greenhouse perennial, from the Cape of Good Hope in 1779: leaves line-like, awl-shaped, channelled, hairy, clammy; inner calyx leaves vaulted at the end; flowers, in May and June, whitish-green, nodding; flower-stalks twice as long as the flowers; propagated by offsets in rich mould.—Jacq. Ic. II. T. 445.

19. Banded White Flower (*A. vittata*, Ker). An ornamental, bulbous-rooted, greenhouse perennial, six inches high, from the Cape of Good Hope in 1802: flowers, in July and August, yellowish-green, nodding; flower-stalk shorter than the leaves, few flowered, filaments two-toothed; propagated by offsets in sandy peat.—Bot. Mag. 1329. [Q. R.]

ALBUMEN (from the Latin, *Albus*, "white"). White of egg, in its most common signification; but applied with some modification in other meanings.

ALBUMEN. In vegetable anatomy, is the outer seed-pulp (*endospermium*, Richard; *perispermium*, Jussieu), that part of a seed which is supposed to correspond to the white of a bird's egg, while the inner seed-pulp (*vitellus*) is supposed to correspond to the yolk. In the missletoe the albumen is green; in wheat and oats it is white and mealy; in spurge it is oily; and it is very abundant in the cocoa-nut. Neither this nor the *vitellus* seem to be connected with the embryo with vessels, though according to the experiments of Dr. Yule and M. Mirbel, they serve to nourish it. Sometimes, as in the rose, the albumen seems to be wanting; but in such cases it exists in very small quantities, or is supposed to be contained within the substance of the embryo. [B. E.]

In vegetable physiology, the albumen appears to supply nourishment to the fleshy seed-lobes (*cotyledons*) in a great number of cases; and, indeed, in seeds producing leafy lobes, it exhibits a cellular tissue filled with farinaceous, oily, or mucilaginous matter, similar to fleshy seed-lobes. We may ask, by what way moisture arrives at this albumen; and how the emulsive matter of the albumen arrives at the embryo, since the embryo has no organic connection with it? These are points in the history of germination which have not been cleared up by experiment. It would be curious to try to make a seed germinate whose embryo has been deprived of its albumen, and to see whether a dwarf plant would be produced, as when fleshy seed-lobes are removed.

We can, notwithstanding, explain very well the nutritive office performed by the albumen and by fleshy seed-lobes; and thereby confirm the practical law long admitted by agriculturists, and recently proved by M. Albert (*Bulletin des Sciences Agricoles*, xiii. 9), that in every species we ought to choose for sowing the plumpest and best nourished seeds, in order to obtain the strongest plants.

Thick seed-lobes, and the albumen of seeds in general, contain materials abundantly charged with carbon. Of this the oxygen of the air partly deprives them, and causes them, in consequence, to retrograde, by a series of phenomena the reverse of that of maturation. Thus the seed-lobes of peas, and the albumen of barley, produce, during germination, a saccharine matter, such as they present before their maturity. M. Senebier, accordingly, and more recently, M. Treviranus, remarked that if a pea is made to germinate a little before its absolute maturity, it germinates much quicker than when fully ripe. They prevent, in fact, the period of complete ripening, to which it would have to turn back in the usual process of germination. M. Duhamel had observed this fact in the seeds of the ash; but M. Lefebvre was not able to make rape-seed germinate before it was ripe. Mr. Keith has therefore not been quite so precise as we could have wished in making the maturity of the seed indispensable to germination. [F. D.]

ALBUMEN. In vegetable chemistry, is the same as GLUTINE.

ALBUMINOUS (in Latin, *Albuminosus*). Containing albumen.

ALBURNITY (in Latin, *Alburnitas*). A disease of trees, in which a layer of soft wood is found between harder layers, owing, no doubt, to the difference of the seasons when these several layers were produced. A dry and warm season will produce harder wood than one which is cold and wet; and of course, intermediate seasons will produce intermediate degrees of hardness in the layers. [B. E.]

ALBURNUM (from the Latin, *Albus*, "white"). Pulpwood, or as it is popularly termed, *sapwood*, the layer of whitish soft substance which is found immediately under the inner layer of bark, and over the outer layer of hard wood in our forest trees and shrubs. It is the outermost and last formed layer of the trunk, which is always the softest and whitest. It owes its formation to the descent of the pulp, or sap, which has been elaborated in the leaf, and which is deposited as it descends between the bark and alburnum of the former year. In the following spring it is the chief channel of the sap's ascent, for which, from its soft and succulent texture, it seems to be well adapted. But it remains in the state of alburnum only so long as it is the outer layer, the new layer that is formed above it taking the name of alburnum in its turn, while the old alburnum, being now an inner layer,

and no longer the main channel of the movements of the vegetable juices, grows gradually harder and denser, and of a duller or deeper shade each succeeding year, till at last it is converted into what is called the heart-wood (*duramen*) of the plant. See GROWTH OF PLANTS. [S. E.]

ALBUS (Latin). White in general; but in botanical, as well as in popular language, there are many sorts of white.

ALCEA. The common name of the *Malva Alcea* of Linnæus; and also the generic term under which Linnæus described the *Althæa rosea* and *Althæa ficifolia* of Cavanilles. [A. C.]

ALCHEMILLA, Linnæus (from *Alkemelyeh*, its Arabic name). Lady's Mantle. *Tetrandria Monogynia*, Linnæus; *Sanguisorbeæ*, Jussieu. Calyx tubular, four or eight cleft, the alternate segments smallest; no corolla; style from the base of the seed-organ; one seed, naked, covered with the calyx.—De Cand. Prod. II. 589.

I.

CALYX EIGHT-CLEFT; STAMENS TWO TO FOUR; PERENNIAL.—ALCHEMILLA, *De Candolle*.

1. *Leaves seven to nine-ribbed, seven to nine-parted.*

1. Cape Lady's Mantle (*A. capensis*, Thunberg). An ornamental, greenhouse, deciduous perennial, six inches high, from the Cape of Good Hope in 1818: leaves kidney-shaped, rather lobed, waved, notched, hairy; flowers, in May and June, green, axillary: propagated by division of the root in peaty loam.—Lam. Ill. T. 86, f. 2.

2. Hybrid Lady's Mantle (*A. hybrida*, Hoffmansegg). An ornamental, deciduous, British perennial, six inches high, common in mountainous districts: leaves kidney-shaped, nine-lobed; stem and leaf-stalks silky; flowers, from June to August, green, stalkless, in pyramidal clusters; propagated by division of the root in common soil. *A. alpina hybrida*, Lin. Spec. 179; *A. vulgaris hybrida*, Willd. Spec. I. 698; *A. montana*, Willd. Enum. I. 190; *A. pubescens*, Lam. Ill. N. 1703.—Pluk. T. 240, f. 2.

3. Pubescent Lady's Mantle (*A. pubescens*, Bieberstein). An ornamental, deciduous perennial, six inches high, from the Caucasus in 1813: leaves kidney-shaped, seven-lobed, toothed, silky beneath; flowers, from June to August, green, in terminal bunches, propagated by division of the roots in common earth. Hort. Ber. II. T. 79.

4. Common Lady's Mantle (*A. vulgaris*, Linnæus). An ornamental, deciduous, British perennial, six inches high, common in meadows and pastures: stem and leaf-stalks smoothish; leaves kidney-shaped, seven-lobed, plaited, saw-toothed; lobes rather roundish; flowers, from June to August, green, in bunches; propagated by division of the roots in common earth.—Eng. Bot. 597.

Var. a. Smooth (*A. glabra*, De Candolle). A plant, nine inches high, from the Pyrenees in 1817: leaves and flowers quite smooth; flowers, from June to August, green.

Var. b. Variegated (*A. variegata*). A plant produced in our gardens: flowers, from June to August, green.

2. *Leaves hand-like, five to seven-parted.*

5. Alpine Lady's Mantle (*A. alpina*, Linnæus). An ornamental, British, deciduous perennial, six inches high, common in rocky and mountainous places: leaves hand-like, with five or seven oblong, lance-shaped, blunt, toothed or saw-toothed lobes, silvery beneath; flowers, in July, green, in bunches; propagated by division of the roots in common soil. *A. argentea*, Lamarck.—Eng. Bot. 244.

6. Cleft-leaved Lady's Mantle (*A. fissa*, Schleicher). An ornamental, deciduous perennial, nine inches high, from Switzerland in 1826: leaves kidney-shaped, seven-lobed, fringed; lobes cleft-toothed; flowers, from June to August, green, in bunches; propagated by division of the roots in common soil.

7. Silky Lady's Mantle (*A. sericea*, Willdenow). An ornamental, deciduous perennial, six inches high, from Caucasus in 1813: leaves hand-like, seven-lobed; the lobes lance-shaped, pointed, deeply saw-toothed, silky beneath; flowers, from June to August, green, in headed bunches; propagated by division of the roots in common soil.

3. *Leaves hand-like, three to five-parted.*

8. Aphanes-like Lady's Mantle (*A. aphanoides*, Mutis). A native of New Grenada: stem creeping, rather smooth; leaves deeply three-lobed, the lobes fringed, the middle one three-parted, the two side lobes two-parted; leaf-scales two or three-parted; flowers axillary and terminal.

9. Hairy Lady's Mantle (*A. hirsuta*, Kunth). A native of South America?: stem erect, branched, hairy; leaves three-parted, hairy; lobes fan-like; leaf-scales two or three-parted; flowers in terminal panicles.

10. Snow Lady's Mantle (*A. nivalis*, Kunth). A native of the snowy summits of mountains in the province of New Grenada: stem erect, very leafy; leaves tiled, stem-sheathing, many-parted, externally silky and hairy; flowers stalkless, terminal.

11. Round-leaved Lady's Mantle (*A. orbiculata*, Ruiz and Pavon). A Peruvian species: stem sending off runners, covered with long loose hairs, leaves round, kidney-shaped, cut, lobed, smooth above and silky beneath; flowers in kind of bunches. *Aphanes orbiculata*, Persoon.

12. Comb-toothed Lady's Mantle (*A. pectinata*, Kunth). A native of New Grenada: sending off runners, thread-shaped, branching, in pairs; leaves comb-toothed; root-leaves on very long stalks, kidney-shaped, many-parted; leaf-scales three to five parted; flowers terminal.

13. Five-leaved Lady's Mantle (*A. pentaphylla*, Linnæus). An ornamental, deciduous perennial, six inches high, from Switzerland in 1784: leaves three together, smooth; leaflets many-parted, fringed, smooth; flowers, in July, white, in kind of umbels; propagated by division of the roots in common soil.—Boc. Mus. I. T. 1.

14. Wing-leaved Lady's Mantle (*A. pinnata*, Ruiz and Pavon). A perennial of cold and moist places of the mountains of Tarma: stem creeping; leaves winged; leaflets two or three-parted; root-leaves on footstalks; other leaves stem-clasping; flowers on axillary flower-stalks. *Aphanes pinnata*, Persoon.

15. Rock Lady's Mantle (*A. rupestris*, Kunth). A perennial of the mountain Ruca-Pichincha in Peru: stem creeping, branched; leaves deeply three-parted, silky and hairy beneath; the lobes cut and saw-toothed; flowers in a kind of bunches.

16. Sibbaldia-leaved Lady's Mantle (*A. sibbaldiæfolia*, De Candolle). An ornamental, greenhouse, deciduous perennial, six inches high, from Mexico in 1823: leaves deeply three-parted, silky, the segments inversely egg-oblong, cut-toothed; leaf-scales two to four-parted; flowers, in July, white; propagated by division of the roots in loam, peat, and sand.—Humb. and Bonp. N. 6, 561.

17. Three-parted Lady's Mantle (*A. tripartita*, Ruiz and Pavon). A perennial of the mountains of Pillao and Tarma: leaves three-parted; the lobes wedge-shaped, many-cleft; leaf-stalks sheathing; flowers in bunches, which branch in pairs.

18. Volcanic Lady's Mantle (*A. vulcanica*, Schlecht). A trailing greenhouse perennial, from Mexico: stems trailing, in the form of runners, rather hairy; stem-leaves in threes; leaflets wedge-shaped, deeply five to seven-toothed at the tip; leaf-scales two-cleft; flowers axillary, in small leafy clusters at the ends of the branches; propagated by division in peat and loam.—Linn. Trans. 5, p. 573.

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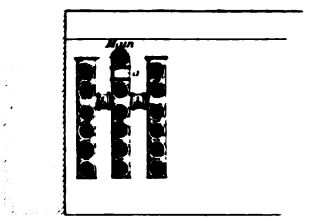

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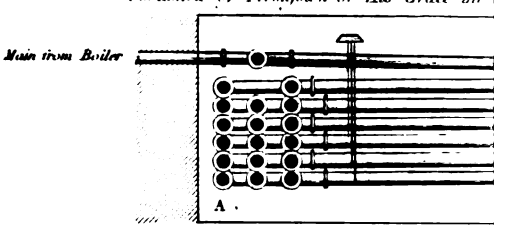

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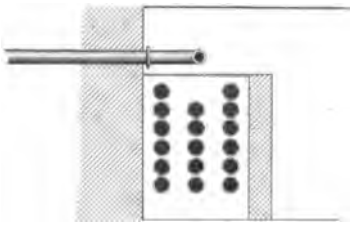

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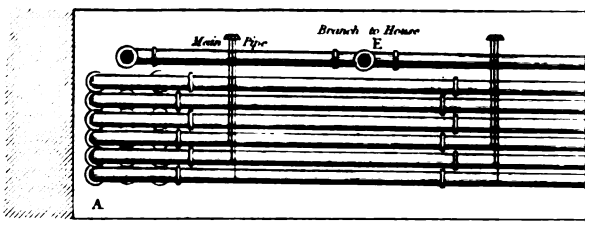

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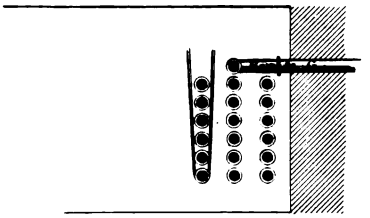

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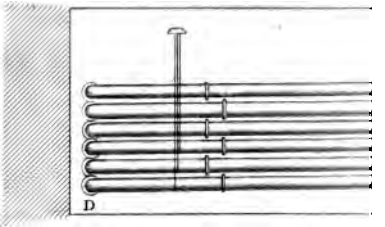
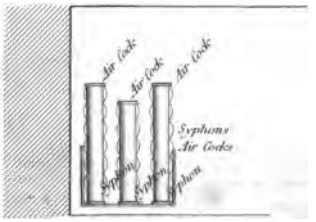
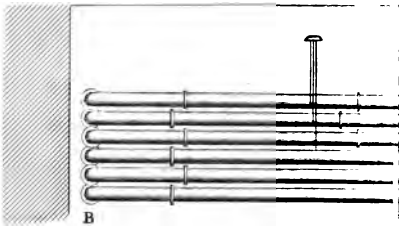


Elevation of Pipes in the Sid[e]



Section on Line S.T. shewing the Iron Tanks & Branches for carrying off the Condensed Water Syphons – Air Cocks, &c.



¼ Inches to Foot

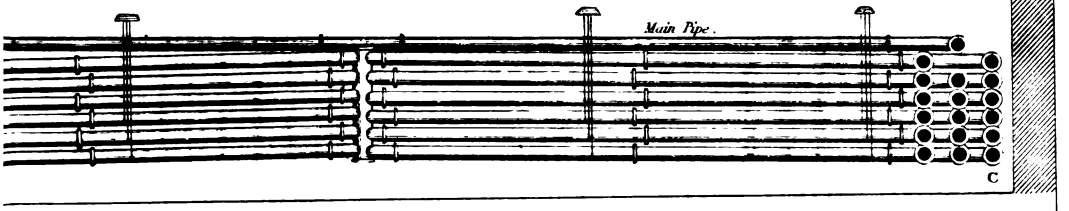
Drawn by Richd Forrest. Heathfield Terrace. Turnham Green.

London. Published by Orr & Smith

...sion of the Conservatory at Syon House Middlesex.

...ke of Northumberland.

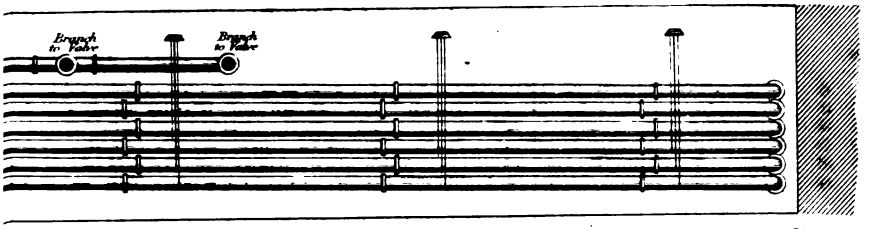
M



Elevation of Pipes in the Side A of Central House F.

N

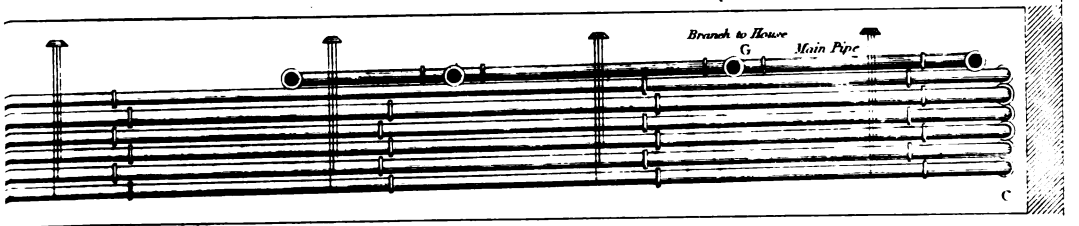
1¼ Inches fall from Centre to End.



F. shewing the Branches from the Main to the House E. & to the Steaming Valves.

4 Inches fall in this Length.

Q

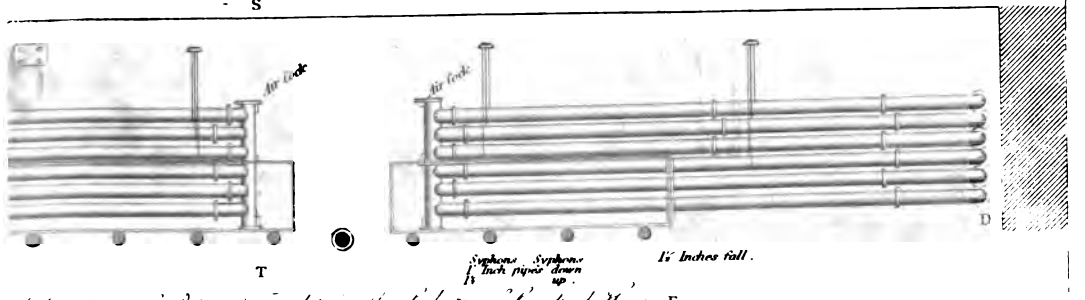


C of Central House F. shewing the Branches from the Main to the House G. & to the Steaming Valve

R

4 Inches fall in this Length.

S



T

Syphons ½ Inch pipes
Syphons down up.

1½ Inches fall.

...evation of Pipes & Tanks in the Side D. of Central House F.

Engraved by J. Bower, Tenterville, London.

...Queen Corner, Paternoster Row.

II.

CALYX FOUR-CLEFT, RARELY FIVE-CLEFT: STAMENS, ONE OR TWO FERTILE, THE REST BARREN; ROOTS ANNUAL.

18. Parsley-piert, or Breakstone (*A. arvensis*, Scopoli). A British, deciduous, creeping annual, three inches long, common in dry pastures and on walls: leaves three-parted, lobes wedge-shaped, toothed, downy; flowers, from April to June, green, in axillary heads; propagated by seed in common soil. *A. aphanes*, Lurs; *Aphanes arvensis*, Linnæus.—Eng. Bot. 1011.

19. Cornucopian Lady's Mantle (*A. cornucopioides*, Römer). An uninteresting annual, two inches high, from Spain in 1826: leaves three-parted, hairy, on dilated sheathing leaf-stalks; the lobes two or three-cleft; flowers, in June and July, in axillary heads; propagated by seed in common soil. *Aphanes cornucopioides*, Lagasca. [G. L.]

ALCHORNEA, Swartz. Spurge Tree. *Monadelphia Octandria*, of Linnæus; *Euphorbiaceæ*, Jussieu. Flowers dicœcious; calyx three-parted; anthers two-celled; style very short; stigma lobed; capsule with two, rarely three cells; one seed in each.

1. Chesnut-leaved Spurge Tree (*A. castaneæfolia*, A. Jussieu). A tree from the banks of the Oroonoco: leaves lance-shaped, pointed, saw-toothed, smooth on both sides; flowers in spiked panicles.

2. Broad-leaved Spurge Tree (*A. latifolia*, Swartz). A tree, twenty feet high, from Jamaica: leaves alternately oblong, blunt, finely toothed, very smooth; flowers axillary, in clustered panicles. [A. C.]

ALCINA, Cavanilles (named from *Alcina*, a Spanish naturalist). Alcina's Plant. *Syngenesia Necessaria*, Linnæus; *Compositæ Helianthea*, Jussieu.

1. Perfoliate Alcina's plant (*A. perfoliata*, Cavanilles). An uninteresting greenhouse annual, three feet high, from Mexico in 1796: flowers, in July and August, yellow; propagated by seeds in common soil.—Cav. Ic. I. 15. [A. C.]

ALCOVE (from the Arabic). A recess: applied in gardening to an ornamental covered seat. See ARBOUR.

ALCYONIDIUM. We think it doubtful whether the natural productions usually described under this generic name belong to plants; they certainly appear as much of an animal nature as the sponges.

ALDEA, Willdenow. A genus formerly including *Phacelia circinnata*, Jacquin, and *P. Aldea*, Römer.

ALDER TREE (*Alnus glutinosa*, Gærtner; *Betula Alnus*, Linnæus). The common Alder appears generally as a shrub; but if allowed to attain maturity it will grow to a stately tree. The bark in old trees is blackish, and full of clefts; on the young shoots it is smooth, and of a purplish hue. The leaves have a dark green colour, and roundish shape, resembling those of the hazel, nicked on the margin, smooth, and clammy to the touch. The foot-stalk is about an inch long; the leaf-ribs on the under side have spongy balls at the angles, as in the leaves of the lime tree. The male catkins are cylindrical, appear in the autumn, and remain on the tree till spring. The female catkins are of a short conical form, like a small fir cone.

Alder Tree.

The Alder is often planted as a coppice wood in wet and boggy places where no other trees will thrive, and cut down every tenth or twelfth year for poles. It may also be often used to advantage on swampy ground for fences, and may be conveniently trained to any desired height. The young trees may be planted to great advantage for securing the banks of water-courses from the torrents which so frequently make sad havoc in washing them away. We certainly know of no tree so well adapted to this purpose as the Alder; for, on account of the numerous suckers which it constantly sends up from the bottom, and the very fibrous nature of their roots, the banks become in time one mass of strongly interwoven roots.

Wherever it may be desirable to complete a prospect by extending plantations over sterile, cold ground, water-galls, or boggy swamps, no tree we know of is equal to the Alder, even in a picturesque point of view. Mr. Gilpin, in his Remarks on Forest Scenery, observes, that, "He who would see the Alder in perfection, must follow the banks of the Mole in Surrey, through the winding and delightful vales of Dorking and Mickleham, into the groves of Esher. The Mole, indeed, is far from being a beautiful river; it is a silent and sluggish stream. but what beauty it has, it owes greatly to the Alder, which everywhere fringes its meadows, and in many places forms very pleasing scenes; especially in the vale between Box Hill and the high grounds of Norbury Park."

This did not escape the poetical eye of Spenser:—

"One day, quoth he, I sate, as was my trade,
Under the foot of Mole, that mountain hoare,
Keeping my sheep among the coolly shade
Of the green alders on the Mulla's shore."—COLIN CLOUT.

The generality of trees acquire picturesque beauty by age; but it is not often that they are suffered to attain this venerable period: some use is commonly found for them long before that period. The oak falls for the greater purposes of man, and the alder is ready to supply a variety of his smaller wants.

The remark as to the wants and purposes of man tending to prevent the growth of trees to their full maturity, is too well exemplified in the case of the Alder; yet they are sometimes allowed to come to perfection. Mr. Beevor mentions an Alder in his garden, which, at four feet from the ground, measured upwards of sixteen feet in circumference.

Some of the largest Alders we have seen in England are growing in the Bishop of Durham's park at Bishop-Auckland, and some very fine ones are to be found in his Grace the Duke of Northumberland's grounds at Sion House. We fully agree with Mr. Gilpin in his commendation of the Alder. It is always associated in our minds with river scenery, both of that tranquil description most frequently to be met with in the vales of England, and with that of a wilder and more picturesque cast, which is to be found amidst the deep glens and ravines of Scotland. Whoever has traversed the banks of the North and South Esks, winding their rocky way through the extensive domain of his Grace the Duke of Buccleuch, Dalkeith Park, near Edinburgh—the Marquis of Lothian's, Newbattle Abbey—and Lord Melvil's, at Melvil Castle,—will bear testimony to the picturesque effect of the Alder. The romantic scenery about Roslin Castle and Hawthorndean is much indebted to the Alder for fine effect.

Sir Thomas Dick Lauder says, "In very many instances we have seen the Alder put on so much of the bold, resolute character of the Oak, that it might have been mistaken for that tree except for the intense depth of its green colour. The Mole may doubtless furnish the traveller with very beautiful specimens of the Alder, as it may also furnish a specimen of that species of quiet English scenery we have alluded to; but we venture to assert, that nowhere will the tree be found in greater perfection than on the wild banks of the river Findhorn and its tributary streams, where scenery of the most romantic character everywhere prevails."

"The Alder, like the Birch," says Marshall, "suffers as an ornamental tree from an association of ideas; we not only see it very common, but we see it in low, dreary, dirty situations; nevertheless, if the Alder be suffered to form its own head, in an open, advantageous situation, it is by no means an unsightly tree. In Stowe Gardens, in what is called the old part, there are some very fine ones; and in coming round from the house by the road leading to Buckingham, there is one which is truly ornamental. Hacked and disfigured in the manner in which Alders in general are, they have but little effect in doing away the unsightliness of a swamp; but if they were suffered to rise in groups and singlets, open enough to have room to form their full tops, and close enough to hide sufficiently the unseemliness of the surface, even a moor or a morass, seen from a distance, might be rendered an agreeable object."—(*On Planting*, II. 37.)

The wood of the Alder is used for making charcoal and heating ovens, and is valuable for piles, pumps, sluices, and in general for all works under water; "because," says Pliny, "it will endure for many years." It is said to have been used under the Rialto at Venice; and we are told that the morasses about Ravenna were piled with it in order to lay foundations for building upon. In Flanders and Holland it is raised in great quantities for this purpose. It serves also many domestic and rural uses, such as for cart-wheels, spinning-wheels, milk-vessels, bowls, spoons, and other turnery ware, troughs, handles of tools, clogs, pattens, and wooden heels. The roots and knots furnish a beautiful veined wood for cabinets. The Scottish Highlanders often make chairs of it, which are very handsome, and of the colour of mahogany.

Sir Thomas Dick Lauder tells us that the old trees, which are full of knots, cut up into planks, make very handsome tables. "We have seen some of these," says the Baronet, "made from some enormous trees that grew at Dalwick, on the property of Sir John Nasmyth, in Peeblesshire; and no foreign wood we have ever seen can match them for beauty."

The bark, though nearly superseded by logwood, is used by dyers, tanners, and leather-dressers; and also by fishermen for dyeing their nets. Both the bark and young shoots dye yellow, and with a little copperas, a yellowish grey, very useful in the demi-tints and shadows of flesh colour in tapestry. The shoots cut in March will dye a cinnamon colour; and a fine tawny, if they be dried and powdered. The fresh wood yields a dye the colour of rappee snuff. The catkins dye green, and the bark is used as a basis for black. The bark and leaves have been sometimes employed in tanning leather, the whole tree being very astringent.

The Alder delights in a very moist soil, where few other trees will thrive:—

"The alder, owner of each waterish soil."—FAIRFAX'S TASSO.

It is also an old opinion that it does not injure grass, but rather nourishes its growth:—

"The alder, whose fat shadow nourisheth;
Each plant set neere to him long flourisheth."—W. BROWNE.

Marshall is of a very different opinion. "In low swampy situations," he says, "where the ground cannot be drained but at too great an expense, the Alder may be planted with propriety and advantage; but wherever the

soil is or can be made pasturable, the Alder should by no means be allowed to gain a footing. Its suckers and seedlings poison the herbage; and it is a fact well known to the observant husbandman, that the roots of the Alder have a peculiar property of rendering the soil they grow in more moist and rotten than it would be if not occupied by this aqueous plant. Plantations of Alders should therefore be confined to swampy, low, unpasturable places; except when they are made for the purposes of ornament; and in this case the native species ought to give place to its more ornamental varieties, of which Hanbury makes five; namely, the Long-leaved Alder, the White Alder, the Black Alder, the Hoary-leaved Alder, and the Dwarf Alder."—(*On Planting*, II. 37.) The cut-leaved is a pretty variety.

It is propagated by layers, cuttings, or truncheons about three feet in length. Such truncheons are often employed for securing the banks of rivers, either by planting them very close, or crosswise. For general purposes, however, we approve of raising the young trees by layers. This operation should be performed in October, and by the autumn following they will have taken root sufficiently to be transplanted. The distance at which these trees should be placed, if intended for a coppice, is a yard square; and at the expiration of seven years, when they may be felled for poles, every other stool may be taken away; and if the small lateral shoots be taken off in the spring, it will very much strengthen the upright poles, provided a few small shoots be left at certain distances upon the trunk, to detain the sap for the increase of its bulk.

The Alder may be raised from seeds sown in beds in the same way as is usual for Birch; but propagation by truncheons or layers is the most speedy process for obtaining young plants. [L. F.]

The best time for planting Alder truncheons is in February or March. They should be about three feet in length, sharpened at one end, and the ground loosened with an instrument before they are thrust into it, lest by the stiffness of the soil the bark should be torn off, which may prevent their growing. They should be put into the earth about two feet, to prevent their being blown out of the ground by strong winds. After they have made stout shoots the plantations should be cleared from all such weeds as grow tall, otherwise they will overbear the young shoots; but when they have made good heads, they will keep down the weeds, and will require no further care.

If they be raised by laying down the branches, it must be performed in October; and by the October following they will have taken root sufficiently to be transplanted out; which must be done by digging a hole, and loosening the earth in the place where each plant is to stand, planting the young trees at least a foot and a half deep, cutting off the top to about nine inches above the surface, which will occasion them to shoot out many branches.

Mr. South, in the sixth volume of the Letters and Papers of the Bath and West of England Society, has stated, that, on planting a waggon-load of truncheons in such situations as have been described above, they all appeared to succeed by throwing out strong shoots the first summer, but that the year following they all died, not having struck a single root. Concluding that this did not depend on any defect in the soil, he planted it again with small rooted slips, taken from old stubs, few of which failed; most of them having been since repeatedly cut for brush-wood, poles, and other purposes; and of those planted single, he observes, one has formed a conical top of great beauty, and that its bole is three feet seven inches in circumference mid-way between the branches and the ground. From this statement it would seem that the best mode of securing the growth of those trees is the planting of the rooted slips, which can be easily done, as great quantities of young shoots are annually thrown out from about the roots of this sort of trees.

Where there are plantations, or much of this sort of wood on a farm, Mr. A. Young advises that it should be cut when the bark will peel, and be immediately soaked in a pond for two months, as by this means the wood is so much hardened as to be greatly improved in its quality.

The leaves of the Alder are often extensively devoured and the trees injured by the caterpillar of a saw-fly (*Selandria Alni*), as observed by M. Réaumur in France, and by ourselves in England. There is a small beetle, also, with shining dark violet blue wing-cases (*Chrysomela Betulæ*), which we remarked to be very injurious to the extensive plantations of Alder, intended for charcoal, on the Rhine, near Obercassel. [B. E.]

ALDERNEY. In rural statistics, is an island situated about seven miles from Cape La Hogue, and at one time belonged to Normandy, but now belongs to Britain; a narrow strait, which in stormy weather is very dangerous to mariners, divides the island from Normandy, being called the Race of Alderney. In compass Alderney measures about eight miles; it is distant from the nearest part of England thirty, and from the north-east of Guernsey, eighteen miles. Its general aspect is sterile and uncomfortable. The inhabitants were estimated in 1831 at 1045, and are on the decrease; in 1821 they amounted to 1151. They live together in a town near the centre of the island, and their houses are of the same description as those to be seen in Guernsey and Jersey, but inferior. Alderney is a healthy island, and the soil is very fruitful in grain and excellent potatoes, the cultivation of which forms the principal employment of the people. A good deal of this produce is sent to England; but Guernsey is the immediate source from which they chiefly derive the articles purchased. There is a small harbour on the southern coast, called Crabby, only fit, however, for vessels of light burden.

Alderney is ecclesiastically annexed to the see of Winchester, and is governed by laws and a magistracy of its own, subject to the courts of Guernsey. The habits, manners, and appearance of the people come nearer those of the French, whose language they retain, than of the English. They are an industrious race, but the custom that prevails among them, of keeping the land in very small parcels and separate possessions, does not allow them to become individually rich. The territory of Alderney is generally elevated, but consists both of high and low tracts. The grass lands occupy about one-third of the area of the island; and it is chiefly noted for its breed of milch cows, which many great land-holders in England fancy on account of their rich milk. [E. A.]

ALDERNEY COWS. This admired breed of cows is in general fine-boned, but small and ill-made, and of a light red or yellowish colour. Cows of this breed are most frequently met with about the seats of the opulent, from their milk, though smaller in quantity, being more rich in quality than that of most other kinds, and yielding from the same measure a larger portion of cream and butter, which is of a beautiful yellow colour and fine flavour. They are much inclined to fatten, and their beef has a very fine grain, and is well tasted, but rather more yellow or high-coloured than that of other sorts.

Alderney Cow.

Mr. Lawrence, in his general Treatise on Cattle, however, supposes, "that the cattle of the islands on the French coast are collectively known by the name of Alderney;" and that "these are a variety of, and smaller than the Norman; light red, yellow, dun, and fawn-coloured; short, wild-horned, deer-necked, with a general resemblance to that animal; thin, hard, and small-boned; irregularly, often very awkwardly shaped." But he considers this description to refer chiefly to the cows. He thinks "they are amongst the best milkers in the world, as to quality, and in that respect are either before or immediately next to the long horn, but that in weight of butter for inches, they are far superior to all." He has been assured by a respectable friend, that "an Alderney strayed cow, during the three weeks she was kept by the finder, made nineteen pounds of butter each week; and the fact was held so extraordinary, as to be thought worth a memorandum in the parish books." And it is added, that "the Norman and island cattle make fat very quick, and, for their bulk, arrive at considerable weight. The beef," in his opinion, "is of the first class, very fine grained, in colour yellow, or of a high colour, with a bluish cast, and elastic feel, which denotes the closest grained, most savoury, and finest meat." It is in his recollection, that, "some years since, a heifer, bred between Alderney and Kentish home-bred stock, and fattened on cabbages and carrots, made one hundred and fifty stone, dying uncommonly fat." On this ground he supposes, that "this species is, in course, a proper cross for the large and coarse-boned, but in that view he would prefer the real Normans from the Continent, as generally better shaped than the islanders." He likewise states, that "many persons near the metropolis, and along the south and western coast, make a trade of importing these cattle, which are extremely convenient for private families, and make a good figure in parks and lawns."

Mr. Culley, however, remarks, that they are a breed of cattle too delicate and tender to be much attended to by the British farmer, and not capable of bearing the cold of this island, especially the northern parts of it.

By an experiment which is stated in the Report for the County of Kent, made between a large home-bred cow of eight years old, and a small Alderney of two years old, it appears that the home-bred cow, in seven days, gave thirty-five gallons of milk, which made ten pounds and three ounces of butter; and the Alderney cow, in the same length of time, gave only fourteen gallons of milk, but which made six pounds and eight ounces of butter.

Very useful cattle may be bred by crossing these cows with short-horned bulls. The late Mr. Hunter also produced a very beautiful little cow from the Alderney by a buffalo, which is said, in the Middlesex Report, to keep plump and fat, both in summer and winter, on much less food than would be sufficient to support a beast of the same size of the ordinary breed. [H. F.]

ALDINA, Adanson. A generic name for the *Aspalathus Ebenus*, Linnæus. Scopoli has also given this name to the *Vadakoki* of Rheede.

ALDROVANDA, Linnæus (named in honour of Aldrovand, the celebrated Italian naturalist). Aldrovand's Sundew. *Pentandria Pentagynia*, Linnæus; *Droseraceæ*, Jussieu. Calyx with five leaves; petals five, not spurred; stamens five; pistils five, thread-formed, short; the summits blunt; the seed-vessel globular, with five valves, one cell, and ten seeds.

1. Vesicular Aldrovand's Sundew (*A. vesiculosa*, Linnæus). A curious floating aquatic perennial, three inches high, from Italy in 1823: leaves in whirls, narrow, wedge-shaped, with a leaf-stalk ending in six bristly fringes; leaf complicate, almost vesicular; flowers, in June and August white; propagated by division in sandy peat.—Act. Bonn. II. 12. [F. D]

ALE. A liquor obtained from the infusion of malt and hops by fermentation. Ale differs from beer chiefly by having a smaller proportion of hops. There are different sorts of ale brewed, such as strong ale, table ale, pale ale, and brown ale. The pale ale is made from malt which has only been slightly dried, and is generally considered as of more viscid quality than the brown ale, which is produced from malt that has been roasted, or very hard dried. [H. F.]

ALE. In veterinary practice, when good and sound, is a useful cordial for both the horse and the cow. Its operation is temporary, but immediate. After a hard day's work, combined, perhaps, with long fasting and exposure to wet, it recruits the animal strength, and stimulates the weakened stomach to digest the food. The dose is usually a quart, for either the horse or the ox. It should be made just milk-warm before it is given; and

if a higher stimulus be required, a little spirits or ground ginger may be added. This addition, however, is seldom necessary unless the animal be shivering with cold. Like all other medicines of the class of stimulants or cordials, ale is altogether inadmissible when inflammation exists. It quickens the pulse, and in doing so adds to the vigour of every power in the animal economy, whether healthy or diseased. Let it not be supposed that stale or inferior ale will do in such cases as well as any other. If it cannot be had good, it had better be dispensed with. [C. S.].

ALEA, Rumphius. A synonym of *Zinziber*, Ginger.

ALECTORIA, Acharius (from the Greek, *αλεκτωρ*, "unmarried"). Bachelor's Tuft. *Cryptogamia Lichenes*, Linnæus; *Lichenes Cornicularieæ*, Hooker. Plant gristly, somewhat thread-shaped, fibrous, and rather fistulose and cottony within; branched, prostrate or pendulous; shields (*Apotheciæ*) thick, without foot-stalks, bordered, at first hollow, afterwards convex.

1. Maned Bachelor's Tuft (*A. jubata*, Acharius). Tufts three inches in length, pendulous on fir trees in Britain: crust-leaf (*Thallus*) rounded, somewhat shining, livid brown, very much branched; branches thread-shaped, flattish at the axils; fruits, in winter, brown; shields at length convex, entire at the margin. *Lichen jubatus*, Eng. Bot. T. 1880, lower fig.

Var. a. A. chalybeiformis, Acharius. Tufts three inches long, on fir trees in Britain: crust-leaf somewhat simple; branches wavy and twisted, complicated, rather stiff, greyish black, lying down; fruits, in winter, greyish blue.—Eng. Bot. T. 1880, upper fig.

2. Trailing Bachelor's Tuft (*A. sarmentosa*, Acharius). Much branched, two inches and a half in length, on *Azalea procumbens* in Britain: crust-leaf roundish, angular, somewhat pitted, forked, pale yellowish; extremities much branched, lax, and slender.—Eng. Bot. T. 2040.

3. Usnean Bachelor's Tuft (*A. usneoides*, Acharius). A native of the tropics, both in the old and new world, six to eighteen inches long, pendulous on trees. [Q. R.]

ALECTOROLOPHUS. A genus established by Haller, and adopted by Allioni, for *Rhinanthus Crista Galli*, Linnæus. The same term was applied by the ancients to *Erysimum Alliaria*, and also to *Salvia pratensis*. [B. E.]

ALECTRYON, Gærtner (from the Greek, *αλεκτρυων*, "a cock," because the wing of the fruit has a crest like a cock's comb). Cock's-Crest. *Octandria Monogynia*, Linnæus; *Sapindaceæ*, Jussieu. Flowers not known; berry dry, one-celled, with the margin at the apex crested or winged; seed erect, without albumen, fixed to the base of the cell, and girded by an incomplete ring; seed-lobes spirally convolute, with the radicle pointing downwards, as in *Dodonæa*.—De Cand. Prod. I. 617.

1. Tall Cock's Crest (*A. excelsum*, Gærtner). A tree or shrub, with the fruit having a crested wing at the apex. Its native country and general characters have not yet been ascertained; propagation not known. *Euonymoides excelsa*, Solander.—D. C. Sp. 1.

2. Hoary Cock's Crest (*A.? canescens*, De Candolle). A shrub or tree of the eastern coast of New Holland. The fruit is edged around with a wing; leaves oblong, blunt, very hairy; flowers in axillary clusters, which are of the same length as the leaves; fruit nearly like that of *Sameraria*; style attached on both sides to the wing of the fruit?; seed oblong, thick; propagation not known.—D. C. Sp. 2. [A. C.]

ALEGRIA, Sesse. A genus united by Von Martius to *Luhea*.

ALEMBIC (from the Arabic). An apparatus which may be sometimes advantageously used in analyses and in vegetable chemistry, but is not so generally convenient as the retort. [B. E.]

ALETRIS, Willdenow (from the Greek, *αλετρις*, "a female miller"). Meal Flower. *Hexandria Monogynia*, Linnæus; *Hemerocallideæ*, Jussieu. Calyx of one leaf, coloured, funnel-shaped, and wrinkled; six stamens, inserted into the six segments of the calyx; summit of the pistil three-cleft; seed-vessel three-celled, with many seeds; roots simple, fibrous.

1. Golden-tipped Meal Flower (*A. aurea*, Michaux). An ornamental deciduous perennial, six inches high, from North America in 1811: leaves spear-shaped, sword-pointed; flowers, in July and August, yellow, with scarcely any foot-stalk, bell-shaped; fruit wrinkled, very rough; propagated by division of the root in sandy peat.—Willd. Hort. Berlin. 8.

2. Powdery Meal Flower (*A. farinosa*, Willdenow). An ornamental deciduous perennial, six inches high, from North America in 1768: leaves broad, lance-shaped, sword-pointed; flowers, in June, white, stalked, oblong, tubular; fruit smooth, mealy; propagated by division of the root in sandy peat. *A. alba*, Michaux.—Bot. Mag. 1418.

3. Fragrant Meal Flower (*A. fragrans*, Linnæus). A native of Africa: flowers in a thick spike at the top of the stem. [Q. R.]

ALEURISMA, Link (from the Greek, *αλευρον*, "meal"). Meal Mushroom. *Cryptogamia Fungi*, Linnæus; *Hyphomycetes Sepedonei*, Fries. Spore-cells (*sporidia*) simple, somewhat coloured, free, collected in small masses; flocks delicate, partitioned, interwoven, pellucid, at first converging and covering the spore-cases; spores scattered, small, and globular.

1. Reddish Meal Mushroom (*A. erubescens*, Nees von Esenbeck). Plant in form of minute tubercles on putrid vegetables; heads somewhat bursting; flocks few, evanescent; spore-cases globular, whitish, afterwards becoming reddish.—Nees von Esenb. Syst. 52, f. 4. *A. Bulbosorum*, Link; *A. inspersum*, Link; *A. roseum*, Link; *A. sporulosum*, Link.

Obs. *A. flavissimum*, Link, is a *Sporotrichus*; *A. saccharinum*, Link, is an *Isaria*. [N. F.]

ALEURITES, Forster (from the Greek, *αλευρον*, "flour," the plant appearing as if dusted with flour). Bancoul Nut Tree. *Monœcia Monadelphia*, Linnæus; *Euphorbiaceæ*, Jussieu. Male flower with the calyx three-cut; petals five; scales five; filaments columnar; anthers numerous. Female flower with the calyx three-cut; petals five; scales five; styles wanting; stigmas two; berry with two nut-like seeds.

1. Commerson's Bancoul Nut Tree (*A. Ambimix*, Persoon). A shrubby greenhouse tree, from the Isle of France: leaves sparse, broad, three to five-lobed; flowers in composite panicles; the males numerous at the top of the panicle, the females few at the base.

2. Three-lobed Bancoul Nut Tree (*A. triloba*, Willdenow). A fragrant, bark-stove, evergreen tree, ten feet high, from the Society Islands in 1793: leaves three-lobed; propagated by cuttings in sand. [Q. R.]

ALEXANDERS. The genus *Smyrnium*, some species of which were formerly cultivated for salads; but are now supplanted by celery, like which they may be propagated.

ALEXANDRIAN LAUREL (*Ruscus racemosus*, Linnæus). This is supposed by some antiquarians to have been the plant employed by the ancients for crowning victors; but the most general opinion is, that this was the *Laurus nobilis*. [B. E.]

ALGÆ (from the Latin, *Algeo*, "I am cold"). Flags. The term seems primarily to have denoted any sort of plant or herb growing in sea water:—

"——— Cras foliis nemus
Multis, et alga littus inutili
Demissa tempestas ab Euro
Sternet."—Hor. Od. Lib. III. 7.

Yet botanists have extended its application to many plants that are not even aquatic. [I. K.]

Tournefort was the first who united under this common name such plants as he found to possess a general mutual resemblance. Linnæus made the *Algæ* the third order of his *Cryptogamia*, after removing from it all animalised productions. Jussieu greatly curtailed the Linnæan order, but left it still so heterogeneous, that Lamouroux proposed, in 1822, to discard the term altogether from botanical writings, and confine it to the mingled mass of sea weeds and rubbish cast upon the beach of the sea by tides.

M. Agardh, however, in his admirable work, *Systema Algarum*, Lund, 1824, by limiting the term *Algæ* to the *Diatomeæ*, *Nostochinæ*, *Confervoideæ*, *Ulvaceæ*, *Florideæ*, and *Fucoideæ*, rendered the order more uniform and consistent than when it included the *Lichenes* and *Hepaticæ*. Our British botanists, Hooker, Greville, and W. H. Harvey, as well as Dawson Turner and Dillwyn, have done much to elucidate the arrangement of this department of botanical study. The following is Hooker's arrangement of British *Algæ* in 1833:—

I.

INARTICULATÆ.

1. FUCOIDEÆ.	2. LICHINEÆ.	3. LAMINARIÆ.
4. SPOROCHNIDEÆ.	5. CHORDARIA.	6. DICTYOTEÆ.
7. FURCELLARIÆ.	8. SPONGIOCARPEÆ.	9. FLORIDEÆ.
10. GASTROCARPEÆ.	11. ULVACEÆ.	12. SIPHONEÆ.
13. LEMANIÆ.		

II.

CONFERVOIDEÆ (*Harvey*).

(Better ARTICULATÆ, B. E.)

14. ECTOCARPEÆ.	15. CERAMIEÆ.	16. CONFERVEÆ.
17. OSCILLATORIÆ.	18. BYSSOIDEÆ.	

III.

GLOIOCLADEÆ.

19. BATRACHOSPERMEÆ.	20. RIVULARIEÆ.	21. NOSTOCHINEÆ.

IV.

DIATOMACEÆ.

22. DESMIDIEÆ.	23. FRAGILLARIEÆ.	24. STYLLARIEÆ.
25 CYMBELLEÆ.		

The first of these divisions is without joints, the second is jointed, and the last is disjointed, while the third might be joined with the first, being without joints.

The *Algæ*, as characterised by Dr. Hooker, with few exceptions, grow in water, and consist of a globule, or a series of globules or joints placed one at the extremity of the other, so as to form a simple or branched filament, forming a membranous or leathery cellular leaf-plate (*frond*). [B. E.]

Where a root exists it is merely a fibrous or shield-formed base, for the purpose not of nourishment, but of attachment, as in the *Fuci*. The leaf-plate is not uniform in its appearance throughout the several genera of the order. In the *Tremellineæ* it is gelatinous, as in *Palmella nivalis*, the substance that sometimes gives colour to the polar snows; in the *Confervoideæ* it is jointed and filamentose; in the *Ulvoideæ* it is membranous; in the *Fuci* it is leathery.

The fructification of the *Algæ* is perhaps less perfectly known than that of any of the other orders of the *Cryptogamia*; and yet it has received, like them, considerable elucidation from the labours of late investigators. Dr. Hooker describes it as consisting merely of seeds (*sporulæ*) in tubercles, or in processes, issuing from the leaf-plate; or immersed, or more or less scattered on the surface. [I. K.]

The *Algæ* are for the most part of a green colour, and in this respect are precisely similar to the leaves of phanerogamous plants. We have therefore little doubt that their cells contain green chromule, or globuline. When the *Algæ* are of a more or less reddish colour, it is probable that this tinge is produced in a similar manner to the reddish colour of some leaves. This supposition is corroborated by collateral facts, such as the *Ulva fusca* giving off oxygen gas when exposed under water to the sun, in the same way as *Atriplex hortensis rubra*. There are no plants besides in which we can observe so easily as in the *Algæ*, that the colouring matter is in a state of solution in the water contained in their cells, and that the partitions or walls of the cells are quite colourless. Certain red *Ceramia* present this fact in a very curious manner: when we observe them under the microscope, we frequently see that the partition of each of their joints is double; the inner sac contracts, and squeezes the colouring matter till it seems to be only a red threadlet crossing its axis, while the outer portion appears to be empty and colourless. We have observed this in fresh plants of *Ceramium equisetifolium*, *C. Casuarinæ*, and others. (*Flore Franç. 3me edit.* II. 39 et 40). A single *Alga* of a yellow colour has been observed, the *Fucus luteus* of Bertolini; but this colour might be owing to a morbid change, similar to the yellowish or white tinge which all the *Algæ* take when dead. [F. D.]

ALGAROBA (from the Arabic, *Al*, "the," and *kharroub*, "carob tree"). A division of the genus *Prosopis*, taken from the Spanish American name of several of the species, such as *Algaroba de Chile*. The Algaroba-bean is the fruit of the *Ceratonia Siliqua*. [A. C.]

ALGUE-LAGUEN, Feuillée. The *Phytoxis acidissima* of Molina.

ALHAGEÆ, De Candolle. Plants agreeing with *Alhagi* in their more important characters. A division of *Leguminosæ*, known by the flowers being disposed in clusters or spikes, and the pod or seed-vessel almost like a taper, round and long. *Alhagi*, *Alysicarpus?* and *Dremontiera* are the only genera.—De Cand. Prod. II. 352. [A. C.]

ALHAGI, Tournefort (from *Alghul*, or *Algul*, the Arabic name of the *Alhagi Maurorum*). Manna Plant. *Diadelphia Decandria*, Linnæus; *Leguminosæ*, De Candolle. Calyx bell-shaped, five-toothed, teeth small, and nearly equal; corolla pea-blossom-shaped; petals nearly equal, except the keel-petal (*carina*), which is a little shorter than the standard-petal (*vexillum*); the wing-petals are rounded at the tip; seed-organ line-like; style thread-shaped, smooth; pod furnished with a foot-stalk, rather woody, not jointed, few-seeded; seeds kidney-shaped; leaves simple, with leaf-scales (*stipulæ*).—De Cand. Prod. II. 352.

1. Moorish Manna Plant (*A. Maurorum*, Tournefort). A greenhouse shrub, three feet high, from the deserts of Egypt, Syria, and Mesopotamia, in 1714: stem shrubby, leaves inversely egg-oblong; flowers, in July and August, red; teeth of the calyx acute; thorns strong, and longer than in the other species; propagated by seed in sand and loam. In consequence of its producing the drug manna, it is sometimes called the *Hebrew Manna* plant. *Hedysarum Alhagi*, Linnæus; *Alhagi manifera*, Desfontaines; *Ononis spinosa*, Hasselquist, but not of Linnæus; *Manna Hebraica*, D. Don.—D. C. Sp. 1.

2. Hamel's, or Caspian Manna Plant (*A. Camelorum*, Fischer). A frame perennial, one to two feet high, native of the Caucasus: stem herbaceous; leaves lance-shaped, blunt, calyx with the teeth blunt; flowers, in July and August, red; propagated by seed in sand and loam. *Hedysarum pseudo-Alhagi*, Bieberstein; *Hedysarum Alhagi*, Lerche; *Manna Caspica*, D. Don.—Gmelin; D. C. Sp. 2.

3. Nepal Manna Plant (*A. Nipaulensis*, De Candolle). A greenhouse shrub, one to two feet high, a native of Nepal: stem shrubby; leaves inversely egg-oblong, sharp-pointed, ribless, and covered with silvery silky down on both surfaces; calyx longer than the partial flower-stalks, with acute teeth; flowers, in April, red; propagated by seed in sand and loam. *Hedysarum Hamiltonii*, Sprengel.—D. C. Sp. 3.

ALHENNA, or HENNA. The Arabian name of the *Lawsonia alba*. [A. C.]

ALIBERTIA, Richard (named in honour of M. Alibert). Alibert's Tree. *Pentandria Monogynia*, Linnæus; *Rubiaceæ*, Jussieu. Calyx with a tubular limb, five-toothed; corolla tubular, limb spreading, five-parted; stamens with very short filaments inserted into the tube; anthers line-like; styles simple; stigmas five, line-like; berry five-celled; cells many-seeded.—*A. Rich, Mem. Soc. N. H. par.* 5, *p.* 234, *T.* 21, *f.* 1.

1. Eatable Alibert's Tree (*A. edulis*, Richard). An evergreen frame tree, about thirty feet high, from French Guiana in 1824: leaves opposite, leathery, oblong-taper-pointed; leaf-scales somewhat united at the base, acute; flowers white; propagated by cuttings in loam and peat. *Genipa edulis*, Richard; *Gardenia edulis*, Poiret.—Rich. L. C. [A. C.]

ALICASTRUM. The specific name of a species of bread-nut.

ALIEN (in Latin, *Alienus*, "belonging to another," or "foreign"). This term is applied, in rural economy, to waters intruding into places which have been drained or embanked. Alien waters coming from a distance, or from without an embankment or drainage, are thus different from home waters, or internal waters arising from springs within an embanked or a drained field. [B. E.]

ALIENATED (in Latin, *Alienatus*). When the first organs, as the stamens, leaves, &c. give place to others different from the natural habit of the plant. [A. C.]

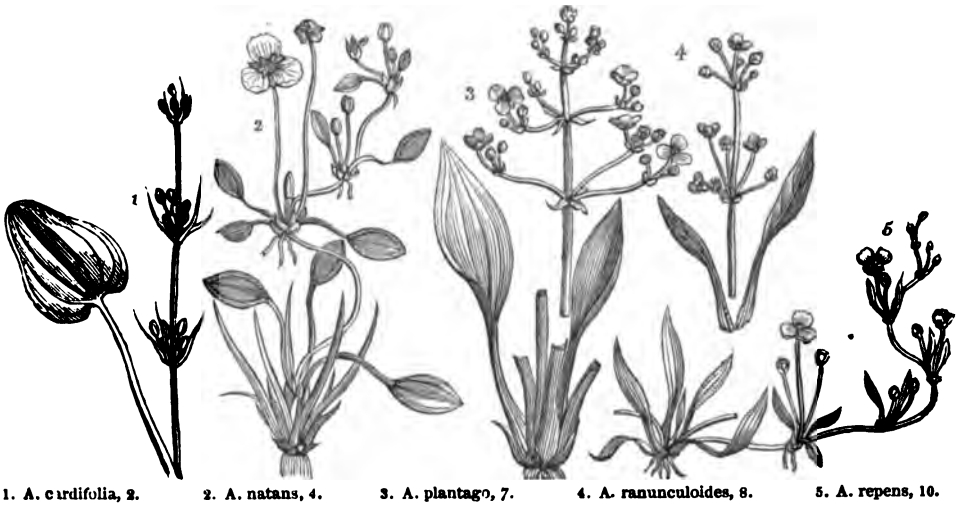
ALIMENT (in Latin, *Alimentum*, from *Alo*, "I nourish"). Whatever nourishes plants or animals. Aliments differ according to the species which devours or absorbs them; but plants seem to exhibit much less difference in this respect than animals, all the species appearing to feed nearly on the same elementary principles, while some animals feed wholly on vegetable aliment, others wholly on animal aliment, and others again, like man, on a portion of both. It ought never to be forgotten, that any aliment containing much nourishment in a small space is not so easily digested, and therefore not so wholesome, as what is more bulky, though less concentrated. See FOOD. [B. E.]

ALIMENTARY CANAL. We give this name to the whole or any part of the internal organs of the animal

body through which the food passes. It is composed of the mouth, the swallow (*pharynx*), the gullet (*œsophagus*), the stomach, and the large and small intestines. [C. S.]

ALIMONIA (from the Latin, *Alo*, "I nourish"). An old term for the sap of plants.

ALISMA, Linnæus (probably from the Greek, 'αλς, "the sea," the plants living in water). Water Plantain.



1. A. cardifolia, 2. 2. A. natans, 4. 3. A. plantago, 7. 4. A. ranunculoides, 8. 5. A. repens, 10.

Hexandria Polygynia, Linnæus; *Alismaceæ*, Jussieu. Flower six-parted, the three outer pieces falling off late, like a calyx, the three inner ones petal-like; seed-organs not definite in number, one-seeded; capsule distinct, not opening.—Spreng. Sys. Veg. II. 163.

1. Bertero's Water Plantain (*A. Berterii*, Sprengel). A perennial of Guadaloupe: leaves oblong, narrowing at each end, three-ribbed; flower-stem three-cornered; capsule sword-pointed.

2. Heart-leaved Water Plantain (*A. cardifolia*, Linnæus). A pretty water and frame perennial, one foot high, from the West Indies in 1810: leaves heart-shaped, many-ribbed; flowers, in July and August, white; petals six-angled; propagated by division of the root in watery soil.—Mor. Plant. Hist. Univ. 15, 4, 6.

3. Lance-leaved Water Plantain (*A. lanceolata*, Withering). A pretty British water perennial, eighteen inches high, common in pools: leaves lance-shaped; flowers, in June and July, purple; propagated by seed in watery soil.

4. Floating Water Plantain (*A. natans*, Linnæus). A pretty water perennial, three inches high, found in the alpine lakes in Wales: leaves oval, blunt; flowers, in July and August, white, on one-flowered stalks; capsule striped; propagated by suckers in watery soil.

5. Parnassia-leaved Water Plantain (*A. parnassiæfolia*, Linnæus). A pretty greenhouse water perennial, six inches high, from Italy in 1820: leaves rather heart-shaped, oblong, pointed, seven-ribbed; flowers, in June and July, white; capsule awned; propagated by division of the root in watery soil.

6. Small-flowered Water Plantain (*A. parviflora*, Pursh). A pretty water perennial, one foot high, from North America in 1816: flowers, in July and August, white, small; propagated by seed in watery soil.

7. Greater Water Plantain (*A. Plantago*, Linnæus). A pretty British water perennial, eighteen inches high, common in pools: leaves egg-oblong, pointed, five to seven-ribbed; flowers, in June and July, purple; capsule bluntly three-cornered; propagated by seed in watery soil.

8. Ranunculan Water Plantain (*A. ranunculoides*, Linnæus). A pretty British water perennial, six inches high, found in turfy bogs: leaves line-like, lance-shaped; flowers, in August, purple; capsule five-cornered, bent inwards; propagated by suckers in watery soil.—Eng. Bot. 326.

9. Kidney-leaved Water Plantain (*A. reniforme*, D. Don). A native of Nepal: leaves on long foot-stalks, which are opposite and in threes; fruit three-cornered, blunt; propagated by division in watery soil.

10. Creeping Water Plantain (*A. repens*, Cavanilles). A pretty British water perennial, six inches long, found in ditches: stem creeping; flowers, in July and August, whitish purple; propagated by division of the root in watery soil.—Cav. Ic. I. 55.

11. Arrow-leaved Water Plantain (*A. sagittæfolium*, Willdenow). A perennial of Guinea: leaves arrow-shaped, rather roundish-egg-oblong; capsules inversely-egg-oblong, blunt.

12. Trivial Water Plantain (*A. trivialis*, Pursh). A pretty water perennial, eighteen inches high, from North America in 1816: leaves oval, heart-shaped, nine-ribbed; flowers, in June and July, white; propagated by suckers in watery soil. [A. C.]

ALISMACEÆ, Richard. A group of water plants resembling *Alisma*. Jussieu classed together in his *Junci* a great number of Monocotyledonous plants very different one from another. The elder M. Richard revised this division, retaining the term *Alismaceæ*, and confining it to the genera *Alisma*, *Damasonium*, and *Sagittaria*. These plants are characterised by six deep divisions, of which the three inner ones are petal-like and soon fall off; the stamens, to the number of six, or sometimes more, are inserted in the calyx; the number of the pistils varies from six to thirty; the seed-organ is one-celled, containing one or two nascent seeds (*ovula*); the fruit, as well as the small capsules, is indehiscent; the seeds enclose an embryo without albumen. [B. E.]

ALL-ABROAD. When the horse is fairly exhausted by long continued or laborious exertion, the contractions of the muscles become weak and irregular; the fore feet come to the ground confusedly, and far asunder; and the horse is said to be *all abroad*. [C. S.]

ALLAGOPTERA, Nees von Esenbeck (from the Greek, 'αλλαγη, "change," and πτερυξ, "a wing," on account of the leaves). Guriri Palm. *Monœcia Monadelphia*, Linnæus; *Palmæ*, Jussieu. Male flowers with a three-leaved calyx; corolla three-petaled; stamens fourteen; filaments united; anthers free; female flowers larger than the male; seed-organ crowned with a wedge-shaped, three-cleft stigma; fruit a one-seeded berry.

1. Small Guriri Palm (*A. pumila*, Nees von Esenbeck). A small palm from South America: leaves winged; the leafits approximating.—Journ. Bot. Ratisb. Mai, 1821. [Q. R.]

ALLAMANDA, Linnæus (named from M. Allamand). Allamand's Shrub. *Pentandria Monogynia*, Linnæus; *Apocyneæ*, Jussieu. Calyx five-parted; corolla with five regular divisions; anthers arrow-shaped, sitting, and jutting out; seed-organ encircled with a disk; stigma adhering to the anthers; fruit round, flat, covered with membranous thorns.

1. Purgative Allamand's Shrub (*A. cathartica*, Linnæus). A trailing evergreen frame shrub from South America in 1785: milky; leaves four in a whirl; flowers, in June and July, large, yellow, on flower-stalks arising between the leaf-stalks at the end of the branches; propagated by cuttings.—Bot. Mag. 338. [Q. R.]

ALLANTODIA, R. Brown (from the Greek, 'αλλας, "a sausage," the envelope being of that form). Arch Fern. *Cryptogamia Filices*, Linnæus; *Filices*, Jussieu. The capsule-groups (*sori*) oblong, and slanting with respect to the mid-rib; envelope (*indusium*) membranous, arch-formed, cylindrical, adhering to a leaf-rib, opening inwards, and at length spreading outwards.

1. Austral Arch Fern (*A. australis*, R. Brown). An ornamental, evergreen, greenhouse perennial, two feet high, from Van Diemen's Land in 1820: fruiting from June till September; fruit brown; propagated by division of the plant in peaty loam.

2. Axillary Arch Fern (*A. axillaris*, Kaulfuss). An ornamental, evergreen, greenhouse perennial, two feet high, from Madeira in 1779: leaves doubly winged; the leafits oblong, wing-cleft; segments spear-shaped, minutely fork-toothed at the base; fruiting from June till September; capsule-group single at the base; propagated by division in peaty loam. *Polypodium axillare*, Hort. Kew.

3. Tender Arch Fern (*A. tenera*, R. Brown). An ornamental, evergreen, greenhouse perennial, one foot high, from New Holland in 1820: fruiting from June till September; fruit brown; propagated by division of the plant in peaty loam.

4. Shady Arch Fern (*A. umbrosa*, R. Brown). An ornamental, evergreen, greenhouse perennial, four feet high, from Madeira in 1779: leaf three wing-leaved; leaflets lance-shaped, decurrent, cut, saw-toothed; capsule-groups (*sori*) contiguous, finally becoming confluent; fruiting from June to September; fruit brown; propagated by division of the plant in peaty loam.—Schk. Fil. 61. [G. L.]

ALLASIA, Loureiro (probably from αλλας, "a sausage"). Arch Tree. *Tetrandria Monogynia*, Linnæus; *Cucurbitaceæ*, De Candolle. Flowers with both stamens and pistils; calyx joined together at the base, surrounded with a very short fence of five segments; corolla of four petals, roundish, very hairy, small; stamens four?; anthers two-lobed?; pistil awl-shaped; summit acute; berry fleshy, large, oblong.—De Cand. Prod. III. 319.

1. Common Arch Tree (*A. Payos*, Loureiro). A tree of Africa: branches spreading, without thorns or prickles; leaves opposite?, finger-like, the five lobes oval, entire, slightly hairy; flowers, pale, on many-flowered stalks.—D. C. Sp. 1. [A. C.]

ALLELUJA. A popular name for wood-sorrel (*Oxalis acetosella*), because Alleluja was formerly sung in churches at the time of the springing up and flowering of this plant. [A. C.]

ALLEY (from the French, *Aller*, "to go"). In gardening, a narrow path, formed by treading the mould down with the feet, between beds, borders, and other parts in gardens, for the convenience of performing different operations in the cultivation of the plants that grow upon them, and in gathering the different kinds of produce. They should be made of different breadths, according to the extent of ground, and the nature of the vegetables that are to be grown upon them. Where the beds are extensive, and the plants upon them of tall growth, or where manure, water, and other materials, are to be conveyed along them, they should seldom have less breadth than from two to two feet and a half. The cross alleys, that divide and separate different large compartments, should likewise have the same dimensions. Between beds of asparagus, they should never be less than two feet; but for strawberries and aromatic herbs, a foot and a half may be fully sufficient. In dividing the smaller sorts of beds, such as those of onions, leeks, carrots, parsnips, beet, spinage, endive, lettuce, and other similar crops, one foot will in general be fully sufficient: and for different crops of the seedlings, such as those of the cabbage, cauliflower, broccoli, celery, and other similar sorts, ten inches may afford space enough for the purpose of performing the operations of pricking them out, weeding, watering, and of drawing such as are in a state to be transplanted.

In flower gardens, courts, and other places about the house, alleys are frequently designed for the purpose of producing an ornamental effect, as well as for the convenience of cultivating and managing the flowers. In these cases they should never have less breadth than two feet, and be made with the finest and best coloured gravel, sand, or other materials, and the beds be previously edged with box, thrift, heaths, or some other plant proper for the use. The beds of pinks, crocuses, tulips, hyacinths, ranunculuses, anemones, and other flowers of the more beautiful kinds, may be separated from each other in this way. [R. M.]

ALLEY. In Agriculture, particularly in the drill husbandry, is the vacant space between the outermost row of corn on one bed, and the nearest row to it on the next parallel bed.

In the practice of drilling, it was first supposed that narrow alleys would not answer the ends for which they were intended; while, on the other hand, the making them very wide would be a loss of ground. About four feet, exclusive of the spaces or partitions between the rows of corn in the beds, was therefore considered as the most suitable and convenient distance.

But it is obvious that it is not necessary to make alleys so wide in good soil, as in those of inferior quality; the intelligent husbandman must, therefore, decide what breadth is the most proper in different cases. One circumstance should, however, be duly attended to; which is, that wide alleys are more easily and much better stirred than those which are narrower: for when an alley is wide, the large furrow in the middle of it may be cut deep, there being then sufficient room to turn the earth over towards the rows; while, on the contrary, the earth, where alleys are too narrow, cannot be stirred deep enough, nor can room be found for what is turned over out of the furrows, without danger of burying some part of the rows of corn.

Supposing the general breadth of the alleys to be about four feet, the whole of that breadth is not to be ploughed nor stirred, either with the plough or cultivator, as soon as the field is sown. Neither of these instruments must go too near the rows of corn, for fear of rooting up the young plants; but a slip of earth, about six inches wide, is directed to be left untouched on the outside of each bed, by which means the part of the alley that is to be stirred will be reduced to the breadth of three feet; and even space is lessened in the first ploughing before winter by a deep furrow, which is then cut close to, and all along these six slips; and the earth taken out of each furrow is thrown into the great furrow in the middle of the alley, which it fills and arches up. These two side furrows make together a breadth of about eighteen inches, and consequently leave, in the middle of the alley, a space of about eighteen inches more, on which is heaped up the earth thrown out of the two furrows; and thus the alleys are to remain during the winter.

By the first hoeing in the spring, the earth heaped up in the middle of the alleys is to be turned back towards the rows of corn. The two furrows that were opened before winter are then filled up, and a new one is cut in the middle of the alley.

This may be very easily done with the common plough; two turns of that instrument being frequently sufficient for the purpose, one on each side of the alley, as near as possible to the beds. But when these two turns are not sufficient to form the furrow perfectly, or where too much earth remains between it and the bed, a third turn becomes necessary, and sometimes a fourth, in order to hollow the middle furrow as it ought to be.

If this work be performed by the plough with two mould boards, the instrument must be placed in the middle of the alley, and the horses in one of the two furrows. The share readily entering a great depth into the earth, which was laid there by the last hoeing before winter, the horses advancing, the ridge of earth is divided into two parts, and fills up the furrows that were made before winter, on each side of the alley, close to the beds.

Thus the high furrow in the middle of the alley may be opened, and the whole operation performed by a single turn of the cultivator, by which so much time and labour is saved, that the farmer may afford one or two stirrings more in the summer, which will be of great advantage.

Wheat, in this kind of husbandry, is usually cultivated upon ridges of about four feet nine inches in breadth, in which are drilled two rows, ten inches asunder; the distance, therefore, between these double rows being nearly four feet. These distances, which M. de Chateauvieux denominated alleys, Mr. Tull has called intervals; and the distances of the two rows of wheat upon the ridge he has termed partitions. This agriculturist first made his ridges six feet broad, and drilled three or four rows upon each ridge; but, upon further experience, he found that two rows upon a ridge of four feet nine inches broad, produced better crops than three or four rows upon six feet ridges; and he recommends these double rows to those who cultivate wheat with the hoe plough. It is likewise observable, that though in his early practice of horse-hoeing wheat, he was cautious of bringing the hoe plough very near the rows. He found, afterwards, that there was no danger in hoeing close to the rows of corn; but, on the contrary, the crop was much improved by it, and that the plough, in hoeing the earth from the rows, could not be brought too close to them, unless it tore out any of the plants, insomuch that he says he could bring the plough within about an inch of the rows when the earth was in temper for it.

The reason why M. de Chateauvieux directed that the hoe-plough should not come close to the rows by six inches, was, that he had not seen Mr. Tull's last "Improvement upon the Hoeing Culture," which was not published till several years after the first parts of the "Horse-hoeing Husbandry" was translated into French.

By the first horse-hoeing of the crop, which was performed in the beginning of the winter, the earth was ploughed away from the rows into the intervals, which formed small ridges in the middle between the double rows. The second hoeing, which was in the spring, turned it back to the rows. The third hoeing was from the rows after the wheat had blossomed; by which the earth is again turned into the intervals, forming small ridges there at the first hoeing. The fourth hoeing returns the earth to the ridges, which is performed a month or more after the third hoeing. This commonly finishes the horse-hoeings, if the land be in good heart, otherwise one or two more hoeings are necessary. The double mould board plough is useful to clear the furrows, and lay all the earth up in ridges after the last hoeing; but no cultivators should be substituted in room of the hoe-plough. [H. F.]

ALL-GOOD. A name of the *Chenopodium Bonus Henricus*, Linnæus.

ALL-HEAL. The English name of the genus *Stachys*, Linnæus.

ALLIACEOUS (in Latin *Alliaceus*, from *Allium*, "garlic"). Having the flavour or smell of garlic or onions; such as sauce-alone, heated arsenic, and the like. [B. E.]

ALLIARIA, Adanson (from the Latin *allium*, "garlic," the plants smelling like garlic when bruised). Sauce-alone. *Tetradynamia Siliquosa*, Linnæus; *Cruciferæ*, Jussieu. Pod roundish, or rather four-seeded, with prominent ribs; calyx loose; seeds rather cylindrical; seed-lobes line-like, oblong, flat. — De Cand. Prod. Pl. I. 196.

1. Common Sauce-alone, or Jack-by-the-Hedge (*A. officinalis*, Andrzejowski). A common British perennial, growing in hedges, from one to three feet high: leaves heart-shaped; pods prism-formed, and much longer than the

flower-stalks; flowers, white, in May; propagated by seed in common soil. *Erysimum Alliaria*, Linnæus.—Eng. Bot. 796; D. C. Sp. 1.

2. Short-fruited Sauce-alone (*A. brachycarpa*, Bieberstein). A hardy perennial, about three feet high, from Iberia in 1824: leaves roundish egg-oblong; pods lance-shaped, of the same length as the flower-stalks; flowers, white, in July and August; propagated by seed in common soil.—D. C. Sp. 2. [A. c.]

ALLIGATOR PEAR. The name in Jamaica of the fruit of the *Anona palustris*. It is large, smooth, heart-shaped, sweet-scented, and of an agreeable flavour, but it is reported to be a strong narcotic, and therefore is not eaten as a luxury. It is sometimes called the *Alligator Apple*.

ALLIONIA, Linnæus (named after C. Allioni, a botanist of Turin). Allioni's Plant. *Tetrandria Monogynia*, Linnæus; *Nyctagineæ*, Jussieu. Corolla of one petal; fence (*involucrum*) three-flowered?; calyx rather entire; corolla four-lobed. Spreng. Syst. Veg. Vol. I. p. 384. Some species, formerly under *Allionia*, are transferred to *Oxybaphus*, Ruiz and Pavon.

1. *The Fence* (involucrum) *five-leaved.*

1. Aggregate Allioni's Plant (*A. aggregata*, Sprengel). A native of Mexico: leaves oblong, rough; flowers on axillary and solitary stalks; fence covered with long loose hairs. *Mirabilis aggregata*, Cavanilles; *Allionia albida*, Walter.

2. Nyctaginean Allioni's Plant (*A. nyctaginea*, Michaux). A native of North America: leaves heart-shaped; flowers on solitary stalks; calyx downy.

3. Egg-leaved Allioni's Plant (*A. ovata*, Pursh). An ornamental annual, eighteen inches high, from North America in 1827: leaves rather heart-egg-oblong, smooth; flowers, in July and August, on axillary aggregate flower-stalks; propagated by seed in common soil.

4. Violet-coloured Allioni's Plant (*A. violacea*, Linnæus). A hardy ornamental annual, about one foot high, from Cumana in 1820: leaves heart-shaped, oblong, entire; flowers, from July to September, violet coloured, in terminal panicles; propagated by seed in loam and peat.—Spreng. Sp. 1.

2. *The Fence* (involucrum) *three-leaved.*

5. Flesh-coloured Allioni's Plant (*A. incarnata*, Linnæus). A hardy ornamental annual, about one foot high, from Pernambuco in 1820: stem lying down on the ground, viscid; leaves obliquely heart-shaped; flowers, from July to September, flesh-coloured; corolla irregular, toothed; propagated by seed in loam and peat.—Spreng. Sp. 8. [A. c.]

ALLIUM, Linnæus (probably from the Latin *Halo*, "I exhale," because of the scent; or from the Greek ἀλλίσθαι, "to spring up"). Garlic, comprehending leeks, onions, chives, and shallots. *Hexandria Monogynia*, Linnæus; *Asphodeleæ*, Jussieu. Corolla inferior, six-parted, spreading; petals egg-oblong, many-flowered; calyx-sheath (*perianth*) regular; umbel clustered; capsule two-celled.—Spreng. Syst. Veg. Vol. II. p. 33.

1. A. Cepa, 24. 2. A. Chamæ-Moly, 27. 3. A. fistulosum, 46. 4. A. magicum, 69. 5. A. oleraceum, 89. 6. A. striatum, 132.

1. Acute-angled Garlic (*A. acutangulum*, Willdenow). A bulbous-rooted perennial, one foot high, introduced in 1816: flower-stalk leafy at the base, sharp-angled; leaves line-like, keeled beneath; flowers, in June and July, red; flower-stalk two-edged; propagated by offsets in common earth.

2. Acute-flowered Garlic (*A. acutiflorum*, L. Deslongchamps). A bulbous-rooted perennial, one foot and a half high, from France in 1819: flower-stalk rounded, naked at the top; leaves line-like; umbels many-flowered, roundish; flowers, in June, red; petals lance-shaped, pointed; propagated by offsets in common earth.—Spreng. Sp. 15.

3. Acute Garlic (*A. acutum*, Sprengel). A bulbous-rooted perennial, one foot high, from France? in 1819: flower-stalk rounded, leafy; leaves roundish, hollow, awl-shaped; sheath (*spatha*) oblong, pointed; flowers, in July, pale purple; umbels pyramidal, erect; petals oblong, pointed, longer than the stamens; propagated by offsets in common earth. *Allium foliosum*, De Candolle.—Spreng. Sp. 74.

4. Whitish Garlic (*A. albidum*, Fischer). A pretty bulbous-rooted perennial, nine inches high, from the Caucasus in 1820: flower-stalk obliquely four-cornered; leaves line-like, pyramidal; flowers, in June and July, white; stamens as long as the corolla; propagated by offsets in common soil.—Spreng. Sp. 14.

5. Doubtful Garlic (*A. ambiguum*, Smith). A bulbous-rooted perennial, a native of Italy: flower-stalks leafy at the base; leaves half-rounded; stamens shorter than the corolla.

6. Pleasing Garlic (*A. amœnum*, G. Don). A bulbous-

rooted perennial, one foot high, from France and Italy in 1821: flowers, in May and June, red; propagated by offsets in common earth. *A. carneum*, Bertolini.—Allioni's Fl. Neap. 28.

7. Vine Leek (*A. Ampeloprasum*, Linnæus). A bulbous-rooted British perennial, two feet high, common on sunny hills in some districts: flower-stalks rounded; leaves line-like, lance-shaped; umbels spreading, roundish; sheath lance-shaped; flowers, in July and August, purple; stamens as long as the corolla; calyx-leaves with a rough keel; propagated by offsets in common soil.—Eng. Bot. 1657. Spreng. Sp. 10.

8. Anderson's Garlic (*A. Andersonii*, G. Don). An ornamental bulbous-rooted perennial, one foot high, from Siberia in 1818: flowers, in June and July, purple; propagated by division of the root in common soil.

9. Angular Garlic (*A. angulosum*, Linnæus). A bulbous-rooted perennial, one foot high, from Germany in 1739: flower-stalk angular; leaves line-like, furrowed beneath; flowers, in June and July, light purple; umbels pyramidal; stamens equal, or longer than the corolla; propagated by offsets in common earth. *Allium inodorum*, Willdenow.—Bot. Mag. 1149. Spreng. Sp. 48.

10. Sand Garlic (*A. arenarium*, Linnæus). A pretty British bulbous-rooted perennial, nine inches high: leaf-sheaths rounded; sheath (*spatha*) blunt; flowers, in June, purple; umbels few-flowered; propagated by offsets in common soil.—Eng. Bot. 1358. Spreng. Sp. 2.

11. Shallot (*A. Ascalonicum*, Linnæus). A well-known bulbous-rooted perennial, nine inches high, from Syria and Asia Minor in 1548: flower-stalk rounded; leaves hollow, awl-shaped; flowers, in June and July, purple; petals lance-shaped, blue, with a dark keel; umbels round-headed; propagated by offsets in rich soil.—Mor. Plant. Hist. Univ. Tab.? Spreng. Sp. 18.

Var. a. Greater Shallot (*A. majus*). A bulbous-rooted perennial, from the south of Europe.—Matt. Oper. Omn. 420.

12. Rough Garlic (*A. asperum*, G. Don). An ornamental bulbous-rooted perennial, one foot high, from the south of Europe in 1800: flowers, purple, from July till September; propagated by offsets in common soil.—Red. Lil. VII. 368.

13. Dark-purple Garlic (*A. atropurpureum*, Waldstein and Kitaibel). A bulbous-rooted perennial, one foot high, from Hungary in 1821: flower-stalk leafy at the base; leaves like a sword with a straight blade; flowers, in July, dark purple; umbels pyramidal, with straight rays; petals line-like, spreading; calyx leaves very narrow; stamens shorter than the corolla; propagated by offsets in common soil.—Walds. et Kit. et Icon. Pl. rar. Hung. 1, 17. Spreng. Sp. 38.

14. Azure Garlic (*A. azureum*, Fischer?). A bulbous-rooted perennial, nine inches high, introduced in 1830: flowers, in October, brown; propagated by offsets in common earth.

15. Baikal Garlic (*A. Baicalense*, Willdenow). A pretty bulbous-rooted perennial, nine inches high, from Siberia in 1816: flower-stalk rounded at the end; leaves line-like, flat, channelled at the base; flowers, in June and July, purple, in roundish umbels; stamens longer than the corolla; propagated by offsets in common soil.

16. Furrowed Garlic (*A. bisulcum*, Bot. Mag.) A pretty bulbous-rooted perennial, nine inches high, from Siberia: flower-stalk rounded, longer than the leaves; flowers, in July, purple, in roundish umbels; stamens as long as the corolla; propagated by offsets in common soil.—Bot. Mag. 1381.

17. Short-chived Garlic (*A. brachystemon*, De Candolle). An ornamental, bulbous-rooted perennial, one foot high, from the South of Europe in 1819: flowers, in June, white; propagated by offsets in common soil.—Red. Les. Lil. VII. 374.

18. Canadian Garlic (*A. Canadense*, Linnæus). A bulbous-rooted perennial, about six inches high, from North America in 1739: flower-stalk leafy at the base; leaves line-like; flowers, in June and July, purple; sheath (*spatha*) oblong; umbels pyramidal; petals oval, as long as the stamens; propagated by offsets in common soil.—Spreng. Sp. 26.

19. Keeled Garlic (*A. carinatum*, Linnæus). A bulbous British perennial, nine inches high, found in rocky districts: flower-stalks leafy, rounded; leaves line-like, convex beneath; sheath (*spatha*) very long; flowers, in May and June, purple; umbels with loose rays; petals oblong; stamens awl-shaped, shorter than the corolla; propagated by offsets in common soil.—Eng. Bot. 1658. Spreng. Sp. 25.

20. Flesh-coloured Garlic (*A. carneum*, Willdenow). A hardy bulbous-rooted perennial, one foot high, introduced in 1816, native country unknown; flower-stalk leafy; leaves hollow; flowers, in June and July, pale purple; umbels half globose; petals oblong, pointed, lower than the stamens; propagated by offsets in common soil.—Spreng. Sp. 24.

21. Carolina Garlic (*A. Carolinianum*, De Candolle). A bulbous-rooted perennial, one foot high, from Carolina in 1818: flower-stalk leafy at the base, rounded; leaves line-like, blunt; flowers, in June, red; umbels globular; petals blunt; stamens much longer than the petals; capsule many-seeded; propagated by offsets in common soil.—Spreng. Sp. 55.

22. Caspian Garlic (*A. Caspium*, Bieberstein). A bulbous-rooted perennial, one foot high, from the deserts about the Caspian Sea in 1822: flower-stalk rounded; leaves lance-shaped, waved; flowers, in April, white; umbels half round, with very long rays; stamens double the length of the corolla; propagated by offsets in common soil. *Crinum Caspium*, Pallas; *Amaryllis Caspia*, Linnæus.—Spreng. Sp. 40.

23. Caucasian Garlic (*A. Caucasicum*, Bieberstein). A bulbous-rooted perennial, one foot high, from the Caucasus: leaves not flat; sheath (*spatha*) as long as the flower-stalks; flowers, in June and July, pink; stamens twice as long as the corolla; propagated by offsets in common soil.—Bot. Mag. 973.

24. Common Onion (*A. Cepa*, Linnæus). A well-known and useful biennial, about three feet high, native country unknown: flower-stalk and leaves hollow, bellying; flowers, from July to October, white; umbels headed; propagated by seeds in rich mould. There are numerous varieties, such as having but few flowers (*A. pauciflorum*); another having the flowers aggregate (*A. aggregatum*), or crowded together. Spreng. Sp. 17.

25. Onion-formed Garlic (*A. cepæforme*, G. Don). A bulbous-rooted perennial, two feet high, introduced in 1824: flowers, from July to September, white; propagated by offsets in common soil.

26. Drooping Garlic (*A. cernuum*, Rothburgh). A bulbous-rooted perennial, one foot high, from North America in 1806: flower-stalk leafy at the base, and four-angled; leaves line-like, furrowed; flowers, in June, red; umbel pyramidal, lax, drooping; petals blunt; stamens longer than the corolla; propagated by offsets in common soil. *Allium tricorne*, Poiret.—Bot. Mag. 1324. Spreng. Sp. 51.

27. Dwarf Moly (*A. Chamæ-Moly*, Linnæus). A bulbous-rooted perennial, three inches high, from Calabria and the North of Africa in 1774: scarcely any flower-stalk; root-leaves four to five, line-like, pointed, hairy; flowers, in January and February, from seven to ten, white, with the outside purple or greenish; petals longer than the stamens; capsules drooping; propagated by offsets in common soil.—Bot. Mag. Spreng. Sp. 47.

28. Fringed Garlic (*A. ciliatum*, Cyrilli). A pretty bulbous-rooted perennial, nine inches high, from Naples in 1820. It differs only from *A. subhirsutum* in the smallness of the flowers. Flowers, in May, white; propagated by offsets in common earth.

29. Ash-grey Garlic (*A. cinereum*, Lehmann). A bul-

bous-rooted perennial, one foot high, from Siberia in 1829: flowers, in July and August, straw-yellow; propagated by offsets in sandy loam.

30. Crosier Garlic (*A. circinatum*, Sieber). A bulbous-rooted perennial, from Crete: flower-stalk leafy at the base; leaves thread-like, spirally twisted, rather hairy; flowers in three-flowered umbels; petals pointed, longer than the stamens.

31. Clusius's Garlic (*A. Clusianum*, Retz). A bulbous-rooted perennial, nine inches high, from the South of Europe in 1803: leaves line-like, flat, fringed; flower-stalk rounded; flowers, from June to August, white, in few-flowered umbels; propagated by offsets in common soil.—Clus. Rar. Plant. Hist. I. 192.

32. Coloured Garlic (*A. coloratum*, Sprengel). A bulbous-rooted perennial, native country unknown: flower-stalk rounded and leafy; leaves half-rounded, flaccid; flowers in umbels, the rays of which are drooping and coloured; petals blunt, shorter than the stamens.

33. Crowded Garlic (*A. confertum*, Persoon). A bulbous-rooted perennial, four feet high, a native of Europe: propagated by offsets in common earth. *A. campestre*, Schleicher. Mor. Pl. Hist. Univ. Oxon.

34. Close Flowered Garlic (*A. congestum*, G. Don). An ornamental bulbous-rooted perennial, one foot high, from Siberia in 1818: flowers, in May and June, purple; propagated by offsets in common soil.

35. Barren Garlic (*A. controversum*, Willdenow). A pretty bulbous-rooted perennial, introduced in 1816: sheath (*spatha*) with a very long point; leaves flat; flowers, in June and July, purple; all male; stamens three-pointed; propagated by offsets in common soil.

36. Cowan's Garlic (*A. Cowani*, Lindley). A bulbous-rooted perennial, nine inches high, from Chili in 1823: flower-stalk somewhat cylindrical; leaves oblong, lance-shaped, pointed, fringed with hair; flowers, in June, white; petals blunt, spreading; umbels pyramidal; calyx leaves blunt; stamens shorter than the corolla; propagated by offsets in common soil.—Bot. Reg. 758. Spreng. Sp. 37.

37. Sicilian Garlic (*A. Cupani*, Rafinesque). A bulbous-rooted perennial, native of Sicily: flower-stalk thread-like, leafy; leaves capillary, twisted; flowers in three-flowered? upright umbels; sheath (*spatha*) one-valved; petals lance-shaped, pointed, longer than the stamens.

38. Danube Garlic (*A. Danubiale*, Sprengel). A bulbous-rooted perennial, one foot high, from Germany in 1818: flowers, in June and July, red; propagated by offsets in common earth.

39. Deflexed Garlic (*A. deflexum*, Willdenow). A pretty bulbous-rooted perennial, six inches high, introduced in 1820: leaves very narrow; flower-stalk curved downwards; flowers, in June and July, pale-purple; stamens three-pointed, as long as the corolla; propagated by offsets in common soil.

40. Stripped Garlic (*A. denudatum*, De Candolle). A bulbous-rooted perennial, six inches high, from Siberia in 1819: flower-stalk leafy, somewhat angular; leaves roundish, straight; flowers, in July and September, whitish-red; umbels rather pyramidal; stamens longer than the corolla; propagated by offsets in common soil. *Allium flavescens*, Besser.—Spreng. Sp. 78.

41. Descendent Garlic (*A. descendens*, Linnæus). A bulbous-rooted perennial, one foot high, from Switzerland in 1796: flowers, in July, dark purple, in umbels; the outer flower-stalks the shortest; stamens three-pointed; propagated by offsets in common soil.—Bot. Mag. 251.

42. Upright Garlic (*A. erectum*, G. Don). A bulbous-rooted perennial, one foot high, from the Cape of Good Hope in 1823: flowers, in June, white; propagated by offsets in common soil.

43. Well-scented Garlic (*A. euosmon*, Link and Otto). An ornamental bulbous-rooted perennial, one foot high, introduced in 1829: flowers, in June and July, white; propagated by offsets in common soil.

44. Exserted Garlic (*A. exsertum*, G. Don) A bulbous-rooted perennial, three feet high, from Russia in 1818: flowers, from June to August, white; propagated by offsets in common soil.

45. Fischer's Garlic (*A. Fischeri*, Sweet). A bulbous-rooted perennial, one foot high, from Siberia in 1829: flowers, from June to October, lilac; propagated by offsets in sandy loam.

46. Welch Onion (*A. fistulosum*, Linnæus). A bulbous-rooted perennial, eighteen inches high, from Siberia in 1629: flower-stalk leafy, bellying; leaves round, smooth, hollow, bellying; flowers, in April and May, greenish-yellow; umbels rather globular; petals pointed, shorter than the stamens; propagated by offsets in common soil.—Bot. Mag. 1230. Spreng. Sp. 81.

47. Yellowish Garlic (*A. flavescens*, Beper). A bulbous-rooted perennial, of Tauria: flower-stalk leafy, and rather cornered at the base: leaves half-rounded, straight; umbels rather pyramidal; stamens longer than the corolla. *A. albidum*, Bot. Mag.?

48. Yellow Garlic (*A. flavum*, Linnæus). A bulbous-rooted perennial, one foot high, from Austria in 1759: flower and stalk-leaves rounded; flowers, in June and July, deep-yellow, drooping; umbels with loose rays; sheath (*spatha*) twice the length of the umbel; petals egg-oblong, shorter than the stamens; propagated by offsets in common soil.—Bot. Mag. 1330. Spreng. Sp. 84.

49. Bent Garlic (*A. flexum*, G. Don). A pretty bulbous-rooted perennial, one foot high, native country unknown: leaves half-round; sheaths (*spathæ*) much longer than the umbel; flowers, in July, dark purple; stamens simple, longer than the corolla; propagated by offsets in common soil. *A. fœtidum*, Willdenow.

50. Leafy Garlic (*A. foliosum*, Fischer). A bulbous-rooted perennial, one foot high, introduced in 1817: flower-stalk leafy at the base; flowers, in July, purple; propagated by offsets in common soil.

51. Fragrant Garlic (*A. fragrans*, Ventenat). A bulbous-rooted perennial, eighteen inches high, from North America in 1822: flower-stalk leafy at the base, rounded; leaves line-like, weak; flowers, in September and October, white; umbels erect, few-flowered; petals oblong, bluntish, longer than the stamens; propagated by offsets in common soil. *A. inodorum*, Aiton; *A. hyemale*, Rafinesque.—Spreng. Sp. 53.

52. Brown-flowered Garlic (*A. fuscum*, Kitaibel). A bulbous-rooted perennial, two feet high, from Hungary in 1820: flower-stalk leafy, rounded; leaves line-like, narrow, notched, angular below; sheath (*spatha*) leafy and very long; flowers, in July and August, brown; umbels with long weak rays; petals somewhat pointed, and about the length of the stamens; propagated by offsets in common soil.—Spreng. Sp. 57.

53. Glandular Garlic (*A. glandulosum*, Link and Otto). An ornamental perennial, one foot high, introduced in 1829: flowers, in June and July, said to be white; propagated by offsets in common soil.

54. Glaucous Garlic (*A. glaucum*, Schrader). An ornamental, bulbous-rooted perennial, one foot high, from Siberia in 1800: flowers, in June and July, pink; propagated by division of the root in common soil. *A. Baicalense*, and *A. spirale*, Willd. enum. *A. senescens*.—Bot. Mag. 1150.

55. Globose Garlic (*A. globosum*, Bieberstein). A bulbous-rooted perennial, one foot high, from the Caucasus in 1821: flower-stalk leafy at the base, rounded; leaves rounded; flowers, in August and September, purple; umbels rather globular; sheath (*spatha*) pointed; petals pointed, shorter than the stamens; propagated by offsets in common earth.—Spreng. Sp. 85.

56. Slender Garlic (*A. gracile*, Hort. Kew.) A pretty bulbous-rooted perennial, three feet high, from Carolina in 1776: leaves line-like, channelled; flower-stalk rounded, very long; flowers, in March and April, white; propagated

by offsets in rich soil. Carolina garlic of gardeners.—Bot. Mag.

57. Milos Garlic (*A. græcum*, Urville). A bulbous-rooted perennial, of the Island of Milos, in the Ægean Sea: flower-stalk leafy at the base; leaves line-like, lance-shaped, longish, hairy; umbels pyramidal, with slender rays; petals pointed, longer than the stamens.

58. Spotted Garlic (*A. guttatum*, Steven). A hardy bulbous-rooted perennial, eighteen inches high, from Odessa in 1819: flower-stalk rounded; leaves half-rounded; flowers, in July, white; umbels headed; petals small, line-like, pointed, spotted; stamens longer than the corolla; propagated by offsets in common soil.—Spreng. Sp. 20.

59. Haller's Garlic (*A. Halleri*, G. Don). A bulbous-rooted perennial, two feet high, from the South of Europe in 1818: propagated by offsets in common soil.—Sibthorp, Fl. Græc. 344.

60. Illyrian Garlic (*A. Illyricum*, Jacquin). An ornamental bulbous-rooted perennial, one foot high, from Austria in 1820: flower-stalk columnar; leaves line-like, lance-shaped, flat; flowers, in July, purple, in flat-topped umbels; propagated by offsets in common soil.—Jacq. Icon. II. 365.

61. Rose-red Garlic (*A. incarnatum*, Hornemann). A bulbous-rooted perennial, one foot high, from Greece in 1812: flower-stalk at the base leafy; leaves line-like, longer than the stem; flowers, in May, red; umbels pyramidal; petals pointed; propagated by offsets in common soil. *A. roseum, Var. b*, R. Brown; *A. intermedium*, De Candolle.—Bot. Reg. 978. Spreng. 29.

62. Intermediate Garlic (*A. intermedium*, Lamarck). An ornamental bulbous-rooted perennial, two feet high, from the South of Europe in 1827: flowers, in August, white; propagated by offsets in common soil. *A. paniculatum*, Villiars.

63. Rush-leaved Garlic (*A. juncifolium*, G. Don). A bulbous-rooted perennial, six inches high, from Chili in 1826: flowers, in May and June, white; propagated by offsets in common soil.

64. Lax Garlic (*A. laxum*, G. Don). A bulbous-rooted perennial, one foot high, from Siberia in 1817; flowers, in June and July, red; propagated by offsets in common soil.

65. Line-leaved Garlic (*A. lineare*, Linnæus). A pretty bulbous-rooted perennial, one foot high, from Siberia in 1752: flower-stalk rounded; leaves line-like, blunt, converse beneath; flowers, in June and July, whitish red; stamens double the length of the corolla; propagated by offsets in common soil.—Gmelin's Flor. Sibir. Tab. I. 13. Spreng. Sp. 13.

66. Sea-side Garlic (*A. litoreum*, Bertolini). A hardy, bulbous-rooted perennial, two feet high, from Italy in 1818: leaves convex beneath; sheath longish; the rays of the umbel lax; stamens equal to the corolla; propagated by offsets in common soil. Spreng. Sp. 5.

67. Long-leaved Garlic (*A. longifolium*, Humboldt). A bulbous-rooted, greenhouse perennial, one foot high, from Mexico in 1826: flower-stalk streaked, leafy at the base; leaves line-like, strap-shaped, blunt, very long; flowers, in July and August, dark purple; umbels few-flowered; sheath bent backward; petals lance-shaped, longer than the stamens; propagated by offsets in sand and loam.—Bot. Reg. 1034. Spreng. Sp.

68. Long-sheathed Garlic (*A. longispathum*, Redouté). A bulbous-rooted perennial, three feet high, from France in 1810: sheath awl-shaped, longish; flowers, in July and August, brown; propagated by offsets in common earth.—Red. Lil. VII. 316.

69. Magic Garlic, or Homer's Moly (*A. magicum*, Linnæus). A bulbous-rooted perennial, one foot high, from Austria in 1596: stem-leaves lance-shaped; flowers, in June and July, greenish-white, in dense umbels; stamens awl-shaped, shorter than the corolla; propagated by offsets in common soil.—Bot. Mag. 1148.

70. Hog Garlic (*A. majale*, Tenore). A bulbous-rooted perennial, two feet high, from Naples in 1824: flower-stalk leafy; leaves broad-lance-shaped, furrowed; flowers, in June, white; umbels compact; petals oval; stamens longer than the corolla; propagated by offsets in common soil.—Spreng. Sp. 39.

71. Pearl Garlic (*A. margaritaceum*, Sibthorp). A bulbous-rooted native of Asia Minor: flower-stalk leafy, rounded; leaves channelled, smooth; petals inversely egg-oblong, blunt, shorter than the stamens.

72. Middle Garlic (*A. medium*, G. Don). An ornamental bulbous-rooted perennial, one foot high, from Hungary in 1820: flowers, from May till July, white; propagated by offsets in common soil.

73. Small-headed Garlic (*A. microcephalum*, Tansch). A bulbous-rooted perennial of Bohemia: flower-stalk rounded and leafy at the base; leaves line-like, flat, ribless beneath; flowers in compact umbels; petals rather pointed, shorter than the stamens.

74. Yellow Garlic, or Moly (*A. Moly*, Linnæus). A bulbous-rooted perennial, one foot high, from the South of Europe and North of Africa in 1604; stem somewhat cylindrical; leaves oblong-lance-shaped, embracing the stem; flowers, in June, yellow, very strong scented; three outer petals spreading, three minor erect; umbels pyramidal-like; stamen shorter than the corolla; propagated by offsets in common earth.—Bot. Mag. 499. Spreng. Sp. 35.

75. Montpelier Garlic (*A. Monspessulanum*, Willdenow). A pretty bulbous-rooted perennial, one foot high, from Montpelier in 1822: like the *A. carinatum*, except that the stamens are three-pointed; flowers, in June, pale purple; propagated by offsets in common soil.

76. Mountain Garlic (*A. montanum*, Smith). A bulbous-rooted perennial, three inches high, from Greece in 1818: flower-stalk leafy; leaves roundish, keeled, as long as the flower-stalk; flowers, in July and August, red; umbels loose; sheath turned downwards; propagated by offsets in common soil. Spreng. Sp. 79.

77. Musky Garlic (*A. moschatum*, Linnæus). A bulbous-rooted perennial, six inches high, from the South of Europe in 1823: flower-stalk leafy, rounded; leaves thread-shaped; flowers, in August and September, whitish-purple; umbels about six-flowered; petals lance-shaped, longer than the stamens; propagated by offsets in common soil. *A. capillare*, Cavanilles.—Spreng. Sp. 93.

78. Many-flowered Garlic (*A. multiflorum*, Desfontaines). A bulbous-rooted perennial, two feet high, from the North of Africa in 1810: flower-stalk rounded; leaves line-like; umbels many-flowered, roundish; sheath falling off soon; flowers, in June, red; petals lance-shaped, pointed; stamens thrusting out, smooth; propagated by offsets in common soil.—Spreng. Sp. 16.

79. Changeable Garlic (*A. mutabile*, Michaux). A bulbous-rooted perennial, six inches high, from Carolina in 1824: flower-stalk leafy at the base, rounded; leaves bristle-like; flowers, in July, red; umbels many-flowered; sheath three-leaved; petals lance-shaped, pointed, longer than the stamens; capsules three-seeded; propagated by offsets in common soil.—Spreng. Sp. 54.

80. Narcissus-flowered Garlic (*A. Narcissiflorum*, Villars). A bulbous-rooted perennial, one foot high, a native of France and Italy: flower-stalk leafy at the base, two-edged; leaves line-like, blunt, furrowed: flowers, in July and August, purple; umbels naked, compact; petals oblong, bluntish, longer than the stamens; propagated by offsets in common soil. *Allium nigrum*, Allioni; *A. grandiflorum*, De Candolle.—Villars, Hist. des Pl. du Dauph. Spreng. Sp. 50.

81. Neapolitan Garlic (*A. Neapolitanum*, Cyrilli). A bulbous-rooted perennial, one foot high, from Naples in 1823: stem two-edged; leaves line-like, strap-shaped, weak; flowers, in July, white; umbels spreading; sheath egg-oblong, petals blunt, spreading, longer than the stamens; propagated by offsets in common soil.—Sweet's Brit. Flow. Garden, 201. Spreng. Sp. 42.

82. Black Garlic (*A. nigrum*, Linnæus). A bulbous-rooted perennial, nine inches high, from Barbary in 1818: flower-stalk rounded; leaves lance-shaped; flowers, in July and August, white; umbels half-round; calyx leaves spreading; seed-organs black; propagated by offsets in common soil.

83. Naked-stalked Garlic (*A. nudicaule*, Lillman). An ornamental, bulbous-rooted perennial, one foot high, introduced in 1829: flower-stalk naked; flowers, in June and July, colour unknown; propagated by offsets in common soil.

84. Nodding Garlic (*A. nutans*, Linnæus). A pretty bulbous-rooted perennial, one foot high, from Siberia in 1785: flower-stalk two-edged; umbel drooping before flowering, afterwards erect; leaves line-like; flowers, in July and August, red; stamens longer than the corolla; propagated by offsets in common soil.—Bot. Mag. 1143 Spreng. Sp. 11.

85. Oblique-leaved Garlie (*A. obliquum*, Linnæus). A bulbous-rooted perennial, eighteen inches high, from Siberia in 1759: stem leafy to the top; leaves lance-shaped, oblique; flowers, in June and July, white; umbels globose; petals pointed; stamens very long; propagated by offsets in common soil.—Bot. Mag. 1408. Spreng. Sp. 46.

86. Yellowish-white Garlic (*A. ochroleucum*, Kitaibel). A bulbous-rooted perennial, one-foot high, from Transylvania in 1816: flower-stalk leafy at the base, rounded; leaves line-like, flat beneath; flowers, in July, yellowish-white; umbels globular; petals blunt, shorter than the stamens; propagated by offsets in common soil.—Spreng. Sp. 58.

87. Much-scented Garlic (*A. odoratissimum*, Desfontaines). A bulbous-rooted perennial, from Northern Africa: flower-stalk leafy at the base; leaves rather rounded, awl-shaped; umbels few-flowered, pyramid-like; petals blunt, longer than the stamens.

88. Odorous Garlic (*A. odorum*, Linnæus). A bulbous-rooted perennial, one foot high, from the South of Europe in 1820: flower-stalk leafy, roundish, somewhat flat; leaves keeled, three-cornered; flowers, in June, white; umbels pyramidal, spreading, many-flowered; petals lance-shaped, pointed, double the length of the stamens; propagated by offsets in common soil. *A. umbellatum*, Haller.—Bot. Mag. 1142. Spreng. Sp. 70.

89. Oleraceous Garlic (*A. oleraceum*, Linnæus). A bulbous-rooted perennial, one foot high, common in British corn fields: leaves rough, half-round, furrowed beneath; flowers, pale yellow, in July; stamens simple; propagated by offsets. *A. virescens*, Lamarck.—Eng. Bot. 488.

90. Rocambole Garlic (*A. ophioscorodon*, G. Don). A hardy, bulbous-rooted perennial, four feet high, from Greece: leaves smooth; sheath roundish; flowers, in August and September, pale red, all male; sheath very long, suddenly tapering to a point; propagated by offsets in rich soil. *Allium scorodoprasum, vav. β*, Linnæus; *A. controversum?* Schrader.—Mor. Plant. Hist. Univ. II. Tab. 15, Fig. 10. Spreng. Sp. 4.

91. Sharp-petaled Garlic (*A. oxypetalum*, G. Don). An ornamental bulbous-rooted perennial, two feet high, from the South of Europe in 1818: flowers, in August, white; propagated by offsets in common soil.

92. Marsh Garlic (*A. palustre*, Lagasca). A bulbous-rooted perennial from Spain: flower-stalk leafy at the base; leaves thread-shaped, rather three-cornered; umbels many-flowered; sheath one-leaved; petals taper-pointed, longer than the stamens.

93. Pallas's Garlic (*A. Pallasii*, Murray). A bulbous-rooted perennial, six inches high, from Siberia in 1819: flower-stalk leafy, rounded; leaves half-rounded, awl-shaped; flowers, in June, red; umbels many-flowered; petals lance-shaped, as long as the stamens; propagated by offsets in common soil.—Spreng. Sp. 90.

94. Pale-flowered Garlic (*A. pallens*, Linnæus). A bulbous-rooted perennial, two feet high, from the South of Europe in 1779: leaves not flat; flowers, in June and July, pale-coloured, drooping; stamens simple, as long as the corolla; propagated by offsets in common soil.—Bot. Mag. 1420.

95. Panicled Garlic (*A. paniculatum*, Linnæus). A bulbous-rooted perennial, two feet high, from the South of Europe, in 1780: flower-stalk leafy, rounded; leaves somewhat roundish, keeled; sheath awl-shaped, longish; flowers, in June and July, of a pale colour; umbels with drooping rays; petals blunt, and about the length of the stamens; propagated by offsets in common soil. *Allium pallens*, Gouan. —Bot. Mag. 1432. Spreng. Sp. 71.

96. Paradoxical Garlic (*A. paradoxum*, G. Don). A bulbous-rooted perennial, three inches high, from the Caucasus in 1823: flowers, in April, white; propagated by offsets in common soil. *Scilla paradoxa*, Bieberstein.

97. Small-flowered Garlic (*A. parviflorum*, Linnæus). A bulbous-rooted perennial, one foot high, from the South of Europe and North of Africa in 1781: flower-stalk rounded; leaves rather rounded, awl-shaped, shorter than the stem; flowers, in June and July, purple; umbels headed; petals awl-shaped, the length? of the stamens; propagated by offsets in common soil.—Spreng. Sp. 73.

98. Piedmontese Garlic (*A. Pedemontanum*, Willdenow). A bulbous-rooted perennial, one foot high, from Piedmont in 1817: flowers, in July and August, red; propagated by offsets in common soil.—Allioni's Fl. Pedem.

99. Hanging-flowered Garlic (*A. pendulinum*, Tenore). A bulbous-rooted perennial, six inches high, from Italy and Greece in 1825: flower-stalk three-angled, leafy at the base; leaves line-like, keeled; flowers, in April and May, white, drooping; umbels few-flowered, with long spreading rays; petals blunt, longer than the stamens: propagated by offsets in common soil. *Allium album*, Savi; *A. lacteum*, Smith.—Spreng. Sp. 64.

100. Hairyish Garlic (*A. pilosum*, Smith). A bulbous-rooted perennial, from the Islands in the Ægean Sea: flower-stalk low, leafy; leaves rounded, longish sheathed, and rather hairy; flower-sheath (*spatha*) equal with the umbel; petals blunt, as long as the stamens.

101. Leek (*A. Porrum*, Linnæus). A well-known bulbous-rooted biennial, about two feet high, from Switzerland in 1562: flower-stalk rounded; leaves lance-shaped, keeled, acute; umbels globular; flowers, in May, purplish, in close, very large balls, on purple flower-stalks; stamens longer than the corolla; propagated by seed in rich soil.—Black's Herbal, Tab. 421. Spreng. Sp. 8. There are two or three varieties.

102. Tree Onion (*A. proliferum*, Schrader). A hardy bulbous-rooted perennial, three feet high, introduced in 1830, native country unknown: flower-stalk rather naked, twisted, hollow; umbels proliferous; flowers, from July to October, white; propagated by offsets in common soil.—Bot. Mag. 1469. Spreng. Sp. 7.

103. Trailing Garlic (*A. prostratum*, Trenore). A bulbous-rooted perennial, from Siberia in 1823: flower-stalk leafy, trailing; leaves rather roundish, two-angled beneath; flowers, in June and July, red; umbels many-flowered; petals blunt, notched; stamens longer than the corolla; propagated by offsets in common soil.—Spreng. Sp. 76.

104. Frosted Garlic (*A. pruinatum*, Link). A hardy bulbous-rooted perennial, eighteen inches high, from Spain in 1819: flower-stalk rounded; leaves round, thread-shaped; flowers, in July, red; umbels erect; petals oblong, blunt, longer than the stamens; style long; propagated by offsets in common soil.—Spreng. Sp. 22.

105. Pretty Garlic (*A. pulchellum*, G. Don). A pretty bulbous-rooted perennial, one foot high, from Tauria in 1810: flowers, in July, scarlet; propagated by offsets in common soil. *A. vineale*, Pursh.

106. Small Garlic (*A. pusillum*, Cyrilli). A bulbous-rooted perennial, three inches high, from Italy in 1826: flower-stalk rounded, leafy; leaves roundish, thread-shaped; flowers in July, white; umbels with fruit-bearing, drooping rays; petals blunt, entire; stamens about the length of the

corolla; propagated by offsets in common soil.—Sprengel, Sp. 77.

107. Branched Garlic (*A. ramosum*, G. Don). An ornamental bulbous-rooted perennial, two feet high, from Siberia in 1819: leaves line-like, rather convex; flowers, in June, pale yellow; umbels globular; stamens awl-shaped, long; propagated by offsets in common soil.

108. Net-rooted Garlic (*A. reticulatum*, Frazer). A bulbous-rooted perennial, one foot high, from North America in 1800: flowers, in June and July, white; propagated by offsets in common soil. *A. stellatum β album*, Bot. Mag.; *A. angulosum*, Pursh; Bot. Mag. 1840.

109. Roseate Garlic (*A. roseum*, Linnæus). A bulbous-rooted perennial, one foot high, from Italy and Dalmatia in 1752: flower-stalk leafy, rounded; leaves line-like; sheath four-leaved; flowers, in June, pale purple, large; petals blunt, with a notch at the top; stamens white, very short; propagated by offsets in common soil.—Spreng. Sp. 59.

110. Round Garlic (*A. rotundum*, Linnæus). A pretty bulbous-rooted perennial, eighteen inches high, from the South of Europe in 1820: flower-stalk rounded; leaves line-like, keeled, acute; umbels inclined to be globular; flowers, in July, purple, lateral, nodding; stamens shorter than the corolla; propagated by offsets in common soil.—Spreng. Sp. 9.

111. Reddish Garlic (*A. rubellum*, Bieberstein). A bulbous-rooted perennial, six inches high, from the Caucasus in 1825: flower-stalk leafy at the base, rounded; leaves half-rounded, furrowed; flowers, in July and August, reddish; umbels convex, many-flowered; petals pointed, longer than the stamens; propagated by offsets in common soil.—Spreng. Sp. 87.

112. Red-rooted Garlic (*A. rubens*, Willdenow). A bulbous-rooted perennial, one foot high, from Germany in 1805: leaves half-round, flattish; flower-stalk rounded; flowers, in June and July, purple, in scattered umbels; stamens lance-shaped, shorter than the corolla; propagated by offsets in common soil.

113. Reddish Garlic (*A. rubicundum*, Niven). A bulbous-rooted perennial, one foot high, from the Cape of Good Hope in 1804: flowers, in July and August, reddish; propagated by offsets in common soil.—Bot. Mag. 1560.

114. Rock Garlic (*A. rupestre*, Bieberstein). A bulbous-rooted perennial, one foot and a half high, from the Caucasus in 1824: flower-stem and leaves rounded; flowers, in June, red; umbels pyramidal; sheath lengthy; petals approaching each other, as long as the stamens; propagated by offsets in common soil.—Spreng. Sp. 88.

115. Cultivated Garlic (*A. sativum*, Linnæus). A very useful bulbous-rooted perennial, about eighteen inches high, from Sicily in 1548: bulb compound; the root bulbous, commonly called *Cloves of Garlic*, invested with a white skin: leaves line-like, long, narrow; flowers, in July, white, rising amidst the small bulbs which terminate the stem; stamens three-pointed; propagated by offsets in rich soil.—Mor. Plant. Hist. Univ. II. Tab. 15. Fig. 9. Spreng. Sp. 1.

116. Rock Garlic (*A. saxatile*, Bieberstein). A bulbous-rooted perennial, one foot high, from the Caucasus in 1823: flower-stalk leafy at the base, rounded; leaves half-rounded; sheath pointed, shorter than the umbel; flowers, in July and August, white; petals spreading, shorter than the stamens; propagated by offsets in common soil.—Spreng. Sp. 86.

117. Chives, or Syze (*A. schœnoprasum*, Linnæus). A bulbous-rooted British perennial, six inches high, common in the moist pastures: flower-stalk rounded, leafy; leaves rounded, hollow; flowers, in May and June, large, faint purple, with a dark line; umbels compact, petals pointed, longer than the stamens; propagated by offsets in common soil. *Allium tenuifolium*, Salisbury.—Engl. Bot. 2438. Spreng. Sp. 83.

118. Rocambole (*A. scorodoprasum*, Linnæus). A hardy bulbous-rooted plant, three feet high, from Denmark in 1596: leaves smooth, sheathed, two-edged; flowers, in July, light purple, for the most part barren; propagated by offsets in common soil.—Spreng. Sp. 3.

119. Scorzonera-leaved Garlic (*A. scorzoneræfolium*, Desfontaines). An ornamental, bulbous-rooted perennial, one foot high: flower-stalk leafy at the base; leaves line-like, lance-shaped; flowers, in June, yellow; umbels few-flowered; petals oblong, blunt, bell-shaped; propagated by offsets in common soil.—Redouté, Liliacées, 99. Spreng. Sp. 30.

120. Narcissus-leaved Garlic (*A. senescens*, Linnæus). A bulbous-rooted perennial, six inches high, from Germany in 1596: flower-stalk angular, two-edged; leaves line-like, convex, and smooth beneath; flowers, in June and July, white: umbels round, upright; stamens longer than the corolla, awl-shaped; propagated by offsets in common soil.—Gmelin's Flora Sibirica.

121. Late-flowering Garlic (*A. serotinum*, Schleicher). A bulbous-rooted perennial, one foot high, from Switzerland in 1820: flowers, in August and September, red; propagated by offsets in common soil.

122. Bristly Garlic (*A. setaceum*, Willdenow). A pretty bulbous-rooted perennial, six inches high, from Hungary in 1805: leaves bristly, awl-shaped, fringed; flower-stalk round; flowers, in July and August, greenish white; calyx with egg-lance-shaped leaves; propagated by offsets in common earth.—Wald. and Kit. Tab. 68.

123. Siberian Garlic (*A. Sibiricum*, Linnæus). A bulbous-rooted perennial, one foot high, from Siberia in 1777: flower-stalk leafy, rounded; leaves half-rounded, as long as the flower-stalk; flowers, in July, pale red; umbels globular; petals lance-shaped, pointed; stamen shorter than the corolla; propagated by offsets in common soil. *A. glaucum*, Desfontaines; *A. palustre*, Salisbury.—Bot. Mag. 1141. Spreng. Sp. 82.

124. Bell-flowered Garlic (*A. siculum*, Ucria). A bulbous-rooted perennial of Sicily: flower-stalk rounded and leafy at the base; leaves lance-shaped or strap-shaped, very long; umbels with erect unequal rays; corolla bell-shaped, the outer petals broadest; stamens shorter than the corolla.

125. Round-headed Garlic (*A. sphærocephalum*, Linnæus). A hardy bulbous-rooted perennial, one foot and a half high, from Italy and Mid Europe in 1759: flower-stalk rounded; leaves hollow, half-rounded; flowers, in July, in conical heads; petals red, with a dark keel; stamens longer than the corolla; style purple, very long; propagated by offsets in common soil.—Bot. Mag. 1764. Spreng. Sp. 19.

126. Spiral Garlic (*A. spirale*, Willdenow). A pretty bulbous-rooted perennial, nine inches high, from Germany in 1802: leaves line-like, spiral; flower-stalk nearly two-edged; flowers, in June and July, white, in headed umbels; stamens longer than the corolla; propagated by offsets in common soil.

127. Spurious Garlic (*A. spurium*, G. Don). An oval, bulbous-rooted perennial, one foot high, from Siberia in 1820: flowers, in June and July, purple; propagated by division of the root in common earth.

128. Statice-like Garlic (*A staticiforme*, Smith). A native of the islands in the Ægean Sea: flower-stalk leafy at the base; leaves rather rounded, bent downwards, shorter than the flower stalk; umbels headed, many flowered; petals inversely egg-oblong.

129. Starred Garlic (*A. stellatum*, Sims). A bulbous-rooted perennial, nine inches high, from North America in 1811: flower-stalk leafy at the base, rounded; leaves somewhat three-cornered; flowers, in June, lilac; umbels pyramidal; stamens shorter than the corolla; propagated by offsets in common soil. *Allium angulosum*, Pursh.—Bot. Mag. 1576. Spreng. Sp. 67.

130. Stellerian Garlic (*A. stellerianum*, Willdenow). A native of Siberia: flower-stalk leafy at the base; leaves half-rounded, erect; umbels half globular; stamens longer than the corolla.

131. Small-streaked Garlic (*A. striatellum*, Lindley). A bulbous-rooted perennial. eighteen inches high, from Chili

in 1823: flowers, in April and May, whitish yellow; propagated by division of the root in common soil. *Ornithogalum gramineum*.—Bot. Mag. 2419.

132. Streaked Garlic (*A. striatum*, Jacquin). A bulbous-rooted perennial, one foot high, from North America in 1800: flower-stalk rather angular below, leafy; leaves roundish, streaked beneath; flowers, in May and June, white; umbels pyramid-like, few-flowered; petals blunt, longer than the stamens: propagated by offsets in common-soil. *Allium ornithogaloides*. Bosc.; *A. Canadense*, Michaux.—Bot. Mag. 1035. Spreng. Sp. 75.

133. Erect Garlic (*A. strictum*, Schrader). A pretty, bulbous-rooted perennial, one foot high, from Volhynia in 1821: flower-stalk erect, rounded; leaves line-like, blunt, convex beneath; umbels globular; stamens nearly as long as the corolla; flowers, in July, pink; propagated by offsets in common soil.—Spreng. Sp. 12.

134. Sweet-smelling Garlic (*A. suaveolens*, Jacquin). A bulbous-rooted perennial, one foot high, from France and Austria in 1801: flower-stalk leafy at the base, roundish; leaves line-like, blunt, furrowed; flowers, in June and July, white; umbels globular; petals blunt; stamens much longer than the corolla; *Allium ambiguum*, Lamarck; *A. graminifolium*, Persoon; *A. ericetarum*, Thore.—Spreng. Sp. 52.

135. Bristly Garlic (*A. subhirsutum*, Linnæus). A bulbous-rooted perennial, one foot high, from Italy and North of Africa in 1596: flowerstalk somewhat angular; leaves line-like, lance-shaped, streaked, fringed with hair; flowers in May, white; umbels pyramidal, with upright rays; petals bluntish, spreading, longer than the stamens; propagated by offsets in common soil. *Allium ciliatum*, Carilli; *A. niveum*, Rothburgh.—Bot. Mag. 774. Spreng. Sp. 43.

136. Synnot's Garlic (*A. Synnotii*, G. Don). A bulbous-rooted perennial, one foot and a half high, from the Cape of Good Hope in 1825; flowers, in July and August, pale red; propagated by offsets in common soil.

137. Sulvian Garlic (*A. Sulvia*, Hamilton). A native of Nepal: flower-stalk rounded, smooth; umbels spreading, many-flowered.

138. Tartarian Garlic (*A. Tartaricum*, Linnæus). A pretty, bulbous-rooted perennial, six inches high, from Siberia in 1787: leaves half-round; flowers, in June and July, white, in flat umbels; stamens simple; propagated by offsets in common soil.—Bot. Mag. 1142.

139. Tenore's Garlic (*A. Tenorii*, Sprengel). A native of Italy and Sicily: flower-stalk leafy at the base; leaves line-like; umbels spreading, few-flowered; sheath egg-shaped, sword-pointed; petals bell-shaped, very blunt; stamens not projecting. *A. carneum*, Tenore.

140. Slender Garlic (*A. tenuissimum*, Willdenow). A native of Siberia: flower-stalk rounded, leafy at the base; leaves awl-shaped, thread-like; umbels few-flowered; petals roundish-egg-oblong, blunt, longer than the stamens.

141. Tineo's Garlic (*A. Tineii*, Presl). A native of Sicily: flower-stalk furrowed, leafy at the base; leaves line-like, erect; umbels few-flowered; petals blunt, longer than the stamens.

142. Three-seeded Garlic (*A. tricoccum*, Aiton). A bulbous-rooted perennial, six inches high, from North America in 1770: flower-stalk roundish; leaves lance-shaped, smooth; flowers, in July, white; umbels globular; capsules three-seeded; propagated by off-sets in common soil.—Spreng. Sp. 45.

143. Three-cornered Garlic (*A. triquetrum*, Linnæus). A bulbous-rooted perennial, nine inches high, from Italy and France in 1759: flower-stalk leafy, three-cornered; leaves keeled; flowers, in May and June, white; umbels few-flowered; petals with a green keel, lance-shaped, longer than the stamens; propagated by off-sets in common soil.—Bot. Mag. 369. Spreng. Sp. 65.

144. Tuberose Garlic (*A. tuberosum*, Rottler). A Malabar species: flower-stalk rounded, leafy at the base; leaves line-like, weak, as long as the flower-stalk; umbels pyramid-like, erect; petals oblong, bluntish, equal in length with the stamens.

145. Rampion, or Ransom Garlic (*A. ursinum*, Linnæus). A bulbous-rooted British perennial, one foot high, common in woods: flower-stalk three-sided; leaves lance-shaped, stalked; flowers, in April and May, large, numerous, white; petals line-like, lance-shaped, spreading; umbels pyramidal; stamens shorter than the corolla; propagated by offsets in common soil.—Eng. Bot. 122. Spreng. Sp. 34.

146. Warty Garlic (*A. verrucosum*, G. Don). A bulbous-rooted perennial, one foot and a half high, from the Cape of Good Hope in 1825; flowers, in July, pale purple; propagated by offsets in common soil.

147. Victoriali's Garlic (*A. Victorialis*, Linnæus). A hardy, bulbous-rooted perennial, about two feet high, from Austria in 1739: flower-stalk leafy at the base; leaves oblong; flowers, in May, grey; umbels pyramid-like; stamens longer than the corolla; propagated by offsets in common soil.—Bot. Mag. 1222. Spreng. Sp. 33.

Var. a. Narrow-leaved Victoriali's Garlic (*A. angustifolium*, Clusius). A bulbous-rooted perennial, one foot and a half high, from Scotland in 1819: leaves narrow; flowers, in May, grey.—Clusius.

148. Vine Garlic (*A. vineale*, Linnæus). A pretty, bulbous-rooted, British perennial, about one foot high, common in meadows: stem and leaves roundish and long, rough; sheath not lasting; flowers, in June, purple; propagated by offsets in common soil. *A. compactum*, Thuillier.—Spreng. Sp. 6.

149. Violet Garlic (*A. violaceum*, Willdenow). A bulbous-rooted perennial, one foot high, from the South of Europe in 1823: leaves flat; flowers, in June, violet; stamens awl-shaped, twice as long as the flowers; sheath longer than the umbel; propagated by offsets in common soil.

150. Waldstein's Garlic (*A. Waldsteini*, G. Don). A bulbous-rooted perennial, two feet high, from Hungary in 1826: flowers, in June and July, purple; propagated by off-sets in common soil. *A. ampeloprasum*, Waldstein.—Wald. and Kit. Disc. et Icon. 82.

[A. C.]

ALLOCARPUS. The generic term under which Kunth has described the *Galinsogea allococarpa* of Sprengel. [A. C.]

ALLOCATHEROS, Elliot. The genus *Gymnopogon* of Beauvois. [A. C.]

ALLODIAL. A law term signifying lands held in a man's own right, and not under any service or acknowledgment whatever to a superior lord. Such lands are therefore distinguished from those held in fee, which always pay some rent or service when demanded. [E. A.]

ALLOMORPHIA, Blume (from the Greek, 'αλλος, "various," and μορφη, "form," from the plant varying in different situations). Vary Shrub. *Tetrandria Monogynia*, Linnæus; *Melastomaceæ*, Jussieu. Tube of the calyx oblong, adhering to the seed-organ at the base; limb four-toothed; petals four, egg-oblong, acute; anthers line-like, acute, straight; style thread-shaped; stigma simple; fruit four-celled.—Blum. in Bot. Zeit. 1831; No. 30, p. 522.

1. Small Vary Shrub (*A. exigua*, Blume). A shrub from Pulo-Penang, varying from half a foot to a foot in height: leaves opposite, on long leaf-stalks, egg-oblong, entire, smooth, five-ribbed; flowers very small, pale red, in terminal panicles; propagated by cuttings in loam and peat. *Melastoma exiguum*, Jack, in Lin. Trans.—Blume. [A. C.]

ALLOPHYLLUS. The name under which Swartz and others have described some of the species of *Schmidelia*; hence, for *Allophyllus Cominia*, Swartz, *A. ternatis*, Louret, and so on, see SCHMIDELIA.

[A. C.]

ALLOSORUS, Bernhardi (from the Greek, αλλος, "various," and the Latin, *sorus*, "a heap"). Vary Fern. *Cryptogamia Filices*, Linnæus; *Polypodiaceæ*, Jussieu. Capsule-groups (*sori*) placed on the cross-forked ribs of the spike-like ringlets, afterwards becoming confluent; common envelope (*indusium*) very narrow, rising from the rolled back margin.

1. Curled Vary Fern (*A. crispus*, Bernhardi). A curious British perennial, three inches high: leaves supra decompound; wings alternate, roundish, cut; fruiting, in July and August; fruit brown; propagated by division in loamy peat. *Pteris crispa*, Linnæus.—Eng. Bot. 1160. [B. E.]

ALLOTEROPSIS, Presl (from the Greek, αλλοτριος, "alien," and οψις, "appearance"). Alien Grass. *Gramineæ*, Jussieu. Spikes rather short; flower-scales husk-shaped, unequal, concave; spikelets hermaphrodite; husks two, egg-oblong, lance-shaped; chaff two; styles two, terminal; stigmas feathery.

1. Twin-spiked Alien Grass (*A. distachya*, Presl). A perennial from California: leaves line-like, plane, beneath velvety; sheath tapered, silken, velvety; stem upright, simple, leafy below, with bearded knots; root fibrous; spikes twin, partial spikes twin, alternate, on foot-stalks; spikelets neuter, one-husked, destitute of chaff. [B. E.]

ALLOTMENT SYSTEM. This designation has been applied to a plan for bettering the condition of the poor by allotting to each family in a parish an extent of ground for the purpose of cultivation with the spade.

Under the article "Agriculture" it is noticed, that in England during the feudal times an allotment system existed. Its object, however, was different: the lords of the soil, having an interest in obtaining as many tenants as they could, for their power was proportionate to their number, portioned their estates into as many small allotments as they could obtain family tenants, receiving in return certain days of military or other service.

When the feudal system was destroyed, the lords let their lands in a similar manner, receiving as rent certain quantities of labour from the tenant, or produce of the land he rented; although, it not being now an object to maintain the number of their tenants, but rather to acquire an increased return of produce, and to obtain a prosperous tenantry, no obstacle was thrown in the way of increasing the size of farms. Land was left like any other subject of investment, and a man obtained as much as his means of cultivating permitted, or as he found to be profitable. These were powerful limitations, for money was scarce, and the agriculturists were chiefly tenants, labourers for hire being few.

In the fourteenth century occurred the greatest revolution that ever happened to the agriculture of this country. The increased demand for wool in the Netherlands and at home, rendered the breeding of sheep much more profitable than the growing of corn, and consequently the arable lands were converted into pastures. England had been very closely cultivated, and the small or cotter-farms were extremely numerous. These were now generally exterminated, and the land-proprietor becoming a great flock-master, converted them all into one breadth of grazing land.

"Your sheep," says Sir Thomas More in his Utopia, "that were wont to be so meek and tame, and such small eaters, are now become such great devourers, and so wild, that they eat up and swallow down the very men themselves."

"One covetous and unsatiable cormorant, and very plague of his native country, compasses about and encloses many thousand acres of ground together within one pale or hedge, the husbandmen are thrust out of their own, or else, either by covin and fraud, or by violent oppression, they are put beside it, or by wrongs and injuries they be so wearied that they be compelled to sell all; by one means or other, either by hook or by crook, they must needs depart away, poor, silly, wretched souls, men, women, husbands, wives, fatherless children, widows, woeful mothers with their young babes, and their whole household, small in substance and much in number, as husbandry requireth many hands. For one shepherd or herdsman is enough to eat up that ground with, to the occupying whereof about husbandry many hands were required."

Some few of the cotter-farmers were reduced to the grade of hired shepherds; others became artisans, a still smaller number retained a plot of land, but a large proportion (for even monastic support was now abolished) became beggars, who, as all records agree, infested England.

This gave birth to the poor laws, and the same reign of Elizabeth was the era of an effort to remedy the evils which had arisen from this destruction of small farms.

It had been experienced that though the tenants of those small farms had been poor, yet none of them were paupers; it was therefore thought that every mode of recurring to such a system must be beneficial; and in accordance with this opinion an act of parliament was passed, commanding that to every cottage that should be erected, four acres of ground should be allotted. This first suggestion of the *Allotment System* failed. The quantity of ground allotted was too large, and from its interfering with the just liberties of the landed proprietors, this act was repealed in the last century.

As the value of all farming produce increased from various causes, the profits becoming commensurately large, cultivators required more extensive farms; consolidation proceeded; and in 1709 the first inclosure act passed; and from that time to the present the small occupiers have gradually further diminished, as their right of commonage and the like was taken away by the four thousand enclosure bills that have since been enacted.

When small farmers are deprived of their tenements, they become, if they continue agriculturists, farming labourers. It becomes a subject of very great political importance, therefore, to ascertain how the character and

comfort of these, who are now by far the most numerous class in society, can be best promoted. It would be here misplaced to examine how the system of poor laws has served in various ways to debase and depress them; our present object must be to consider how the *Allotment System* may be the best made to promote contrary effects.

This system, we have noticed, suggested itself to the legislature in the reign of Elizabeth, but it was of very limited operation.

On the Continent, a system of larger allotments was partially adopted in the year 1707, in the Duchy of Cleves, but we are not aware that the example was followed, till, after the lapse of more than a century, the Dutch government, in 1818, divided tracts of poor soil at Frederick's Oord, and other places, into allotments of seven acres. The government provided overseers to notice the moral conduct and industry of the tenants; advanced capital when needed, which was to be repaid; and an annual rent was to be returned. Manual labour was exclusively adopted. The expense of establishing each individual was £22. 6*s*. 4*d*.; and the annual excess of produce over the subsistence of the family, after deducting the rent, twelve shillings per acre, was £8. 2*s*. 4*d*.—(*M. de Kirchoff. Jacob on the Corn Trade*, &c.)

About the year 1800, Dr. Law, Bishop of Bath and Wells, commenced the *Allotment System;* Sir H. Vavasour communicated to the Board of Agriculture, about the same period, some experiments demonstrating the great benefit of "the Flemish," or "field-gardening husbandry;" and in 1802, Charles Howard, Esq. followed the example.

"On Pulley Common, in Shropshire," says Sir W. Pulteney, "there is, at least there was, a cottager's tenement of about 512 square yards, somewhat more than one-ninth of an acre. The spade and the hoe are the only implements used, and those chiefly by his wife, that he may follow his daily labour for hire. The plot of land is divided into two parcels, whereon she grows wheat and potatoes alternately. In the month of October, when the potatoes are ripe, she takes off the stalks of the plants, which she secures to produce manure by littering her pig. She then goes over the whole with a rake, to collect the weeds for the dunghill. She next sows the wheat, and then takes up the potatoes with a three-pronged fork; and by this operation the wheat-seed is covered deep. She leaves it quite rough, and the winter frost mellows the earth; and by its falling down in the spring it adds vigour to the wheat plants. She has pursued this alternate system of cropping for several years without any diminution of produce. The potatoe crop only has manure. In 1804, a year very noted for mildew, she had fifteen Winchester bushels of wheat from 272 square yards, being four times the general averaging crop of the neighbouring farmers. It is to be wished such instances of cottage industry were more frequent; and more frequent they would be, were proper means made use of to invigorate the spirit of exertion in the labouring class."

Since that period the patrons of the system have been very numerous, and under the influence of Lords Winchilsea, Brownlow, Beverley, and Carrington, Sir John Rushout, Sir John Swinburne, the late Sir Thomas Bernard, Mr. Burdon of Castle Eden, Mr. Babington of Leicestershire, Captain Scobell of High Littleton, Bath, and many others, it has been extensively pursued. The clergy have been especially promoters of this system. Among them the rector of Springfield, in Essex, deserves particular notice, for his exertions and writings in its cause.

Within these few years the legislature has promoted this system, by enabling parish officers to rent or to purchase land, not exceeding twenty acres, for the purpose of allotting it to the labourers of the parish; though this is much disapproved of by Captain Scobell, who very justly, as we think, considers it indispensable for the tenants to hold directly of the proprietors.

It remains for us to notice some of the circumstances which require attention in its adoption.

The *Allotment System* is divided into two branches:—

1. *Home Colonies*, in which the settlers have ground allotted sufficient, or more than sufficient, to support themselves.

2. *Family Allotments*, of such extent as only to occupy occasionally the leisure hours of the tenant and his family.

Of Home Colonies we shall not enter into any lengthy consideration, for they have not hitherto been adopted in this country, nor do they appear to be worthy of that eulogy which has occasionally been bestowed upon them. They have been recommended to be established on the wastes as an outlet and means of support to our redundant labourers; but it is obvious that this could be only a temporary relief, for even supposing the impossibility that every labouring family can be furnished with a cotter-farm, yet at the rate our population goes on increasing, the same necessities as at present would speedily recur. At the best it is but a temporary expedient. No one can object to the formation of such Home Colonies as the means of establishing numerous labouring families in comfortable independence; and we would not object to the extension of such a system, so long as land could be found for the purpose capable of producing more food than is consumed by the tenant during the period of cultivation. But we consider it totally inefficacious as a measure of relief from our pauper population.

As long as there is a demand for population, whether in the form of employment, or by offering a premium in the mode of allowing from the poor-rates so much per child to the pauper labourer, so long will the supply be kept up; and the rapid duplicating of our population must not be expected to be checked till such a system of premiums is abolished; till this additional temptation to increase is removed; or the moral feeling of the poor is improved, so that they may perceive, and obey the perception, that they ought, by all means in their power, to avoid requiring from their fellow men any unearned pittance.

To Family Allotments we can afford more unqualified approbation, provided five circumstances be attended to: namely, 1st. That no labourer shall have more ground than he can easily cultivate without any other assistance than that of his wife and family. 2ndly. That it shall be entirely voluntary on the part of the labourer whether or not he will occupy such an allotment. 3rdly. That he shall pay the full rent for it, and all other dues. 4thly. That every tenant shall be ejected, after due notice, who does not pursue a cleanly and non-exhausting course of cultivation; and 5thly. That the allotment tenant hold directly of the proprietor, and not of any middleman nor parish officer, and that he be prohibited from sub-letting.

Where this system, and so regulated, has been tried, and the experience is now very extensive, the results have been most happy. The condition of the poor has been ameliorated; by rendering them more independent, they have become more contented and more careful; better as citizens, and better as individuals.

If they do not pay the marketable worth of their allotment; if it is at all compulsory; if the land is held of a middleman or parish officer; or if the bad tenant stands upon an equal footing with the good; so in proportion is the cheering feeling of independence and the desire of excellence checked.

If the allotments much exceed a quarter of an acre, or in any way approach to the nature of cotter farms, a proportionate blow is made at that employment of capital and talent in agriculture which has raised it to its present improved state.

"The advantages attending this system," says a clerical writer in the "Christian Observer" for 1832, "besides the comfort of the poor man, are the diminution of the poor's rate, and the moral improvement of the labourer. Since this plan has been in operation, the poor rate has been steadily declining from about £320 to about £180 per annum, with the prospect of still further diminution. When the farmer's work is scarce, the poor man finds profitable employment on his patch of ground, which if he had not to occupy him, he would be sent to idle upon the roads at the expense of the parish. The system has a further and very important effect of improving his character. When the labourer has his little plot of ground, from which he feels he shall not be ejected as long as he conducts himself with propriety, he has an object on which his heart is fixed; he has something at stake in society; he will not hang loose on the community, ready to join those who would disturb it: so much so, that in the late riots no man in the parish showed any disposition to join them."

From the year 1828 to the present time numerous pamphlets upon this subject have appeared, and we may refer our readers for further information to those of Dr. Law, and of Messrs. Scobell, Scrope, Banfill, Denson, Blackiston, Withers, &c.

[P. J.]

Speaking of the vicinity of High Littleton, Captain Scobell says, "There are in this division twenty parishes, fourteen of which are agricultural, and the other six have, besides the usual operations of agriculture, one or more coal-pits situated in each. The population of the division is nearly eighteen thousand, the area about forty-eight square miles, and the number of acres from thirty to thirty-five thousand; and all the parishes are from five to ten miles from any city or town. In the spring of 1831, Field Gardens were introduced in High Littleton and Midsomer Norton; in 1832, they were commenced in three other parishes, two of them solely agricultural; and in March 1833, seven additional parishes followed the example. The results are, that of the twenty parishes forming the division of Chewton, *twelve* of them (comprehending about thirty-two square miles) have adopted the Field Garden system; that these gardens, in these twelve parishes, contain *one hundred and four acres of good fresh land*, occupied by *five hundred and three families*, two hundred and seventy-one of which are of the agricultural population, and two hundred and thirty-two of which are of the coaling population. The whole of this land is let, and the arrangements are managed, by the landlords, or a representative of their appointment. The rents charged range from 2½*d.* per pole, or £1. 16*s.* 8*d.* per acre, to 3½*d.* per pole, or £2. 6*s.* 8*d.* per acre; and the average quantity in each garden is between thirty-three and thirty-four poles. As an exemplification of the operation of these Field Gardens, in one main arrangement, I can say, that the 503 tenants I have spoken of, 500 have paid the whole of their rent; and I happen to know, of the three not yet having done so, one is a widow dangerously ill. But it is a greater evidence of the happy influence of the system, that I can testify that during the *three years'* occupation of the 179 tenants, in High Littleton and Midsomer, *not one has been convicted of any crime whatever*. Many of my tenants assured me that, from the one-third portion of their ground, which is planted in succession with vegetables, not being potatoes, that there has not been a day, for the past year, in which their wives could not go and gather *something* towards a dinner. I have, at some pains, satisfied my curiosity, by ascertaining how the plan operates in promoting the presence of the poor man's friend, the pig.—Of my forty-seven occupiers here, I find that sixteen have usually kept pigs; and that ten others have done so in consequence of their allotments. Some I found had premises without sties, and others had sties without pigs, or money to buy them. To test the effect of confidence, even indiscriminately applied, I offered to lend the means to any in the latter situation. I have done so to seven of them, and have no doubt I shall be repaid, by instalments, to the last farthing. In one case only the promised time of repayment has yet arrived, and that man has refunded the whole amount, leaving with me a written account, shewing he had cleared 1*l.* 7*s.* 2*d.* by his pig. I will here remark, that of my own seventy tenants at High Littleton and Midsomer Norton, none are my workmen, *in any way*, but two of the husbandmen, and that but three others are my cottage renters.

"The provision of manure, an important consideration, continues to increase, which, I think, is attributable to the cartage being done at a penny per pole, without reference to quantity or distance. Into the eight fields, adjacent to the four hamlets of Midsomer Norton, the average, per acre, has this year been seventeen loads; and

at High Littleton, in its two hamlets, it has been twenty-one. But to return to these details of the two parishes with which I am more immediately connected, I will now append a table of reference.

FIELD GARDENS ESTABLISHED IN THE DIVISION OF CHEWTON, SOMERSETSHIRE.

PARISHES.	When established.	No. of Acres in Field Gardens.	No. of Families occupying.	Of these husbandmen, &c.	Of these coaling population.	REMARKS.
Midsomer Norton	1831	30	132	60	72	More than one coal-pit.
High Littleton	—	8½	47	9	38	One coal-pit.
Ston-Easton	1832	4	16	16	—	
Emberrow	—	2	8	8	—	
Clutton	—	14⅓	63	20	43	More than one coal-pit. Five of these acres now letting to additional occupiers.
Stowey	1833	8	18	18	—	
Cameley	—	6½	50	33	17	
Farrington	—	3¼	20	9	11	One coal-pit.
Chewton	—	8	32	32	—	
Chilcompton	—	5½	22	19	3	
Timsbury	—	8	59	11	48	More than one coal-pit.
Compton Martin	—	6	36	36	—	
Totals		104½	503*	271	232	

* At an average of five in each family, 2505 persons.

"Here then we have 271 husbandry or rural families in the occupation of Field Gardens."

In another place Captain Scobell says, "Notwithstanding the thirty acres of old pasture apportioned were of the best quality, it was deemed an expedient preservative for the fertility of the land, to stipulate that, after the first year, not more than two-thirds of each allotment should be cropped with potatoes; but from the unusual strength and fruitfulness of the soil, the produce having reached in some cases one hundred and forty sacks an acre; and from the unexpected supply of manure, it was decided to relax this regulation for another year, but strictly to enforce it hereafter. Small beds of other vegetables have, however, from preference, been cultivated; and the last summer has diffused among the tenants a repetition of cheerfulness and abundance.

"The average of potatoes per acre, has been quite 100 sacks, or 300 Winchester bushels.

"Let us now see by the test of figures, how the account stands between the labourers and their land.

The number of occupiers is 132, and of acres thirty.					
The average produce, 100 sacks per acre.—Total 3000 sacks, or 9000 Winchester bushels, at 5*s.* 6*d.* per sack				£825	0 0
Rent at £2. 6*s.* 8*d.* per acre	£70	0	0		
Seed: 7½ sacks per acre, at 5*s.* 6*d.*	62	17	6		
Haulage of manure (400 loads), at a penny per pole—18*s.* 4*d.* per acre	20	0	0	167	17 6
Tithes, rates, and sustaining fences, charged at three farthings per pole—ten shillings per acre	15	0	0		
Profit—not deducting the cost of labour				£657	2 6

Profit, per acre, £21. 18*s.*—an average of £5. to each occupier, or ten weeks wages at 10*s.* per week.

"But it may be said that the price of labour, as if it had been paid *in money*, should be deducted. I will do so, although I know that it was by all performed at times which would otherwise have been valueless. The account will then stand thus:—

Profit, including labour	£657	2 6
Money value of the labour for the year, at 10*d.* per pole, £7. per acre	217	0 0
	£440	2 6
Add the value of the after-crop, Turnip, Cabbage, &c., not noticed before, 3*d.* per pole—£2. per acre	60	0 0
The profit, deducting the money value of labour	£500	2 6

Profit per acre, £16. 13*s.* 4*d.*, an average of £3. 15*s.* 9*d.* to each occupier, or 7½ weeks' wages at 10*s.* per week.

"The question whether the labour, or a large portion of it, is not a clear profit as well as the produce, is a material one, and is worth our consideration." [B. E.]

ALLOUYA. The common name for the *Calathea Allouya*. [A. C.]

ALLOWANCE. To tenants such as is agreed to be made to them on their quitting farms, or under any other circumstances. [H. F.]

ALLSEED. The English name for the genus *Polycarpon*. [A. C.]

ALLSPICE. 1. The English name of the genus *Calycanthus*. A well-known article of commerce, the berry of the *Pimenta vulgaris*. [A. C.]

ALLSPICE, Jamaica pepper, in veterinary practice, when ground, is often used in the composition of cordial balls for horses; and it enters largely into the formation of almost all the cow-leech's *drinks*. Among uneducated practitioners it is very much abused; but the veterinary surgeon rarely has recourse to it, except in a few cases of indigestion, when better agents are not at hand. By Mr. Bracy Clark, a tincture of allspice has been highly recommended for cholic in horses. It is prepared by digesting one pound of pepper, finely ground, in three pints of spirit of wine, and adding thereto three pints of water. The dose is four ounces every hour till relief be obtained. This tincture is equally useful in indigestion (*hoving*) in cattle, and in the same dose. Allspice, whether in tincture or in powder, increases the digestive power of the stomach, tends to stop fermentation, and in a slight degree, even in small doses, increases the force and frequency of the pulse. [C. S.]

ALLUGHAS. The name in Ceylon of the *Alpinia Allughas*. [A. C.]

ALLUVIUM, or ALLUVION (from the Latin, *Alluvio*, "an inundation"), is a term which, in the English language, has no very defined meaning. Some authors use it to designate all those rocks which have been formed by causes now acting on the surface of the earth, including those of volcanic origin; while others, adhering to the literal meaning of the original term, confine its application to deposits, whatever be their character, that have resulted from inundations. Neither of these definitions convey the same meaning as is usually attached to the word, the one including too much, the other too little. The term has been badly selected, but is used in its proper application to designate all those deposits recently formed, or now forming, by the agency of water, whether from an uninterrupted and constant stream, or from a casual inundation.

All streams, lakes, rivers, seas, and the ocean itself, hold a large quantity of earthy mechanical solution, which they deposit in their beds. The character of the sediment is governed by the nature of the rocks over which the waters flow; and the quantity depends partly upon the constitution of the rocks, and partly upon the power of the water. If the rock be easily destroyed, and a large body of water flow over it with a considerable velocity, the destructive effect will be great, and much worn materials (*detritus*) being formed, the stream will have a thick and turbid appearance. The same effect is frequently produced by the discharge of a number of tributary streams into a river, all of which accumulate a greater or less quantity of the earths over which they flow.

The distribution of water at the present time, and we more particularly refer to rivers, is very different from that of former periods. The majority of the valleys through which rivers are now flowing, have been produced by the action of water, which, running from higher lands, has not only scooped them out, but has spread over them the worn material (*detritus*) which it accumulates in its passage. By the operations which have since been going on, the waters have been collected together in comparatively narrow channels of considerable permanency. On this account, the influence of water that flows over the portions of the earth inhabited by terrestrial animals, is greatly restricted; and the production of new beds of rock or soil is rather an accidental than a necessary consequence.

But, although the influence of water has been thus confined, all lands, and especially the surfaces of mountainous districts, are undergoing change, and the superficial covering of one district is conveyed to another. The showers of heaven are constantly sweeping away the soil and decomposed rocks of the uplands into the valleys, over which they are transported by streams and rivers, the larger and heavier particles falling to the bottom, the smaller being united with the water in mechanical mixture. That portion of earthy matter which is carried away from a district by the running water, is, as far as the district itself is concerned, the most valuable, being the superficial covering or soil, and would be for ever lost to that portion of the earth inhabited by man, were it not arrested in its passage to the ocean, by deposition in the bed of the river, or on those lands which the waters may happen to overflow.

It is well known to those who have visited elevated districts, that many mountains are already deprived of their soils, and are but the skeletons of the earth without covering or life. By this action the valleys are in the process of elevation, and the mountains of depression; and if we could conceive it to proceed without limitation, we may imagine a time when all the varieties of elevation and depression, which now give beauty to the surface, will be destroyed, and an entirely different condition of the distribution of land and water will be established. But at the same time it cannot be denied that these changes, as far as they have hitherto proceeded, have been advantageous to man, whatever might be their result under the conditions to which we have alluded. The mountainous regions are, from their elevation, less suited to the progression of society, so intimately connected with agricultural prosperity, than the plains. As we rise above the level of the sea, the atmosphere becomes more rarified, and the cold more intense, both of which are injurious to vegetation in general, and unsuited to promote the comfort of animal life. The plains are, therefore, preferred by men when they congregate together and form societies. It cannot be considered an unwise or unfit result, that the lowlands should be enriched with alluvial soils, produced by the destruction of the rocks and natural soils of mountainous regions. It is reported of Dioclesian, that he told his colleague, Maximinian, he had more pleasure in the cultivation of a few pot herbs which, in the gardens of Spalatro, grew in the soil that on the top of Mount Hæmus had only produced moss and dittany, than in all the honours the Roman empire could confer. From the definition we have given of the word "alluvium," we must include the gravels and sands that are of recent formation among the alluvial deposits; but our attention is chiefly

directed to the soils, or those beds which are suited to sustain vegetable life. It is true that the gravels may be made available for the cultivation of some plants, but the beds which are so used belong rather to that class of rocks denominated *diluvial*, by Geologists, than to the deposits of which we are speaking.

If we trace the circumstances under which alluvial soils are formed to their cause, we shall find that they have their origin in the fall of heavy rains, and the melting of snows, in mountainous regions. The water, in its passage to the valleys, collects the superficial soil and decomposed earthy material that lies in its path, and transports them into the channels towards which it flows. The streams that are formed on the mountain slopes are generally united together before they reach the plains, and form impetuous torrents, overcoming all obstacles, until their velocity is lost, when, in their winding courses, they meet each other, and form rivers.

Rivers, in every part of their course, are subject to inundation; when, throwing their waters over a considerable space, they deposit the earthy materials they have accumulated. If such inundations had not occurred, the accumulated worn materials (*debris*) would have been deposited in the bed of the river, or carried into the lake or sea where the waters themselves are discharged. There are abundant instances on record of the filling up of rivers by the worn materials (*detritus*), which has been carried into their courses; and any river of our own country will afford a limited example of this result. Many rivers and estuaries, which a few years since were navigable, have ceased to be so, on account of the large amount of alluvial matter deposited in their beds; and many of our towns, which were once populous and wealthy, have on this account become poor and almost deserted. If we would see the effect of the transport of worn materials (*detritus*) into lakes, we cannot have a more favourable opportunity than in Switzerland. Many of the lakes of this sublime and majestic country are rapidly filling from this cause; and, in some of them, water-plants are seen above the surface of the water. But when a river suffers inundation, the earthy matter, which is held is mechanical mixture, is arrested, and deposited on the land that is overflowed, and a richly productive soil is formed. One or two examples may illustrate these remarks.

The Ganges annually overflows its banks and deposits a rich alluvial soil over the country it inundates. This magnificent river was supposed to take its rise on the northern side of the Himalaya mountains, until it was proved, in 1819, by Lieutenant Webb, that all the streams which unite to give it existence, take their rise on the south side of the Hindoo Coast, or Snowy Mountains. The melting of the snows, and the heavy periodical rains augment the volume of the water, and by the end of June, before the rainy season has commenced in the low country, the river has generally risen fifteen feet; but after the rains in Bengal it usually attains a height of thirty-two feet above its ordinary level. By the end of July all the low countries adjoining the Ganges and the Burrampooter are overflowed, and nothing but houses and trees are seen for many miles inward. The province of Bengal is divided into two nearly equal parts by the Ganges; and as a large portion of the country, on the banks of the river is low, it is especially exposed to inundation, from which circumstance it probably derived its name, such districts being called *Beng*. A deep bed of rich soil is deposited during the period of the overflow, and the vegetable productions are of the most varied and luxuriant character. Rice, wheat, barley, tobacco, indigo, cotton, the mulberry, and the poppy, are all cultivated with success on the alluvial soils.

It is well known that Egypt has been from time immemorial indebted to the overflow of the Nile for a rich alluvial soil, as well as for the means of irrigating the land. The ancients seem to have been altogether at a loss to account for the periodical overflow of this river; and when we consider the appearances before them, we are not surprised at the difficulties they experienced. They observed it in a country that was not moistened by a drop of rain, and where it was unaided by a single stream, and yet, at its stated period, it began to lift its waters from their bed, and rising higher and higher, overflowed its banks and spread itself like a sea over Lower Egypt, refreshing the parched earth with moisture, and aiding its productiveness with the formation of a superficial covering of rich loam. The philosophers speculated without success upon its cause; but while they were disputing as to the origin of the phenomenon, year by year the Nile rose, and left the evidence of its beneficial sway in the richness of the crops and the luxuriance of the country. From the investigations that have now been made, we know that the rise of the Nile is occasioned by the rains which fall on the high mountains in the interior and tropical regions, and not, as many of the ancients supposed, from the Etesian winds which, blowing periodically from the north, prevent the waters from reaching the sea.

The great importance of rivers, as agents in the production of alluvial soils, cannot be more strongly proved by any positive evidence, than by a consideration of the state of Australia, a country remarkable for the fewness of its rivers, and the general poverty of its soil. Contrary to all precedents, the richest soils in this land, excepting the alluvial, are found on the summits of hills. The fires which so frequently happen on the plains, the peculiar character of the vegetation (chiefly consisting of evergreens), and the sparing distribution of water, are the principal causes of the sterility of this otherwise desirable country. There are, however, spots which, covered with alluvial soil, can rival the richest and most cultivated districts of England; and the comparison of these with other lands, impresses the observer the more strongly with the great importance of the natural provision for the restitution of that portion of the earth inhabited by man, by the deposition of new earthy matter and a virgin soil. The alluvial flats of the Nepean, the Hawkesbury, and the Hunter rivers, are spoken of by all writers as remarkable for their fertility. The rich valley in which the Lake Alexandrina is situated, may be noticed as another example of the influence of alluvial soils. The country around this lake appears to be one of the most beautiful and fertile in Australia; and a glance at the map will immediately inform the inquirer of the cause. It is so situated as to receive the worn materials (*debris*) of the mountain chain that ranges along the promontory of which Cape Jervis is the southern point, and also to obtain moisture at all times from the Lake, and a renovating soil whenever it may overflow its banks.

Alluvial soils are produced by the discharge of mountain streams into valleys as well as by the overflow of rivers. We have already explained the manner in which they collect the superficial covering of mountainous districts, and being charged with earthy matter bring it into the plains. This may be deposited before the streams are united together in an individual channel as well as after, and should this be done the valley may be covered with alluvial products. The formation of a river is a process which requires time, and many changes must happen before the flowing waters can form for themselves a local habitation; obstacles must be removed, a bed must be scooped out, and an outlet must be formed, in the performance of which earthy matter must be accumulated, and extensive deposits be formed.

A third cause in the production of alluvial deposits may be mentioned. The sea is making great inroads upon many of its shores, carrying on a destructive war against the cliffs that vainly endeavour to oppose its force; while on the other hand it is in some instances receding from the shores against which it once beat; and thus, as though to recompense man for what it takes away, gives to him a portion of its own territory. Those districts which are thus added to the land are usually superposed by a fine rich alluvial soil, as also are those which have at a former period been covered by the sea, and would be at the present day, were it not for the ingenuity and works of man.

The American states of New Orleans and Messolonghi are chiefly alluvial; and Holland, as is well known, has the same character, and can only be described as a district of which man has robbed the ocean. That part of the coast of Germany which is bordered by the North Sea is alluvial, and additions are constantly made to the shores by the gradual depositions of earthy matter upon the immense flats which extend along them. The first sign of vegetation on these lands is the appearance of the saltwort (*Salicornia maritima*), which is succeeded by the sea grass (*Poa maritima*), and when the land is very rich, by the marsh starwort (*Aster Tripolium*). The land is afterwards dyked and used as pasture for sheep and cattle, so that the spot over which the sea has perhaps for ages exercised an undisputed controul, is brought under the power of man in a state most admirably adapted to suit his wants.

It is not, however necessary that we should go to foreign countries for examples of the formation of alluvial soils by the ocean. In Lincolnshire and other parts of the English coast, where the land is beneath the level of high-water mark, unfruitful districts are often restored to a state of fertility by the removal of the artificial banks that prevent the sea water from flowing over it. In this way the land is thrown open to the sea, and as the tide rises it is covered by water, which being overcharged with earthy matter, deposits in two or three years a bed five or six feet thick of rich soil, which may be brought under cultivation by the exclusion of the agent that was instrumental in its production. (See WARPING.)

But it may be asked, whence does the sea obtain the earthy matter with which it abounds? Rivers discharge themselves into the ocean, and it has been already stated that their waters are charged, more or less, with the superficial soil of mountainous countries, and the destroyed materials of rocks. A part of this may be arrested by occasional or periodical inundations, and by deposition in the bed of the river, but a large quantity must still be carried into the ocean. It must also be remembered that the water which is conveyed in a channel, is constantly endeavouring so to arrange its course as to suffer the least possible resistance. In this attempt it attacks the banks that confine it, and widens its course, precipitating much earthy matter into the stream, to be removed by the flowing water. It frequently happens, and especially after the fall of heavy rains, that the water at the mouths of rivers is thick and turbid from the quantity of alluvial matter it holds in solution, and very many large rivers are rendered unsafe for navigation by the existence of large bars of sand or clay at their outlet.

But the sea is not merely a passive recipient of the product of destructive causes, but is itself a cause. Sea coasts are constantly suffering degradation by the action of the waves that beat upon them. Whether we look at the soft and almost unresisting rocks of our eastern coast, or the hard primary rocks of Devonshire, Cornwall, and the Shetland Isles, the same results will be observed. During the stormy months of winter, when the waves are tossed upon the coasts with an almost uncontrolled violence, no rock is sufficiently hard to resist its energy, and when unruffled by a passing breeze in the months of summer, its influence upon the softer rocks is hardly less destructive though more insidious, for it then attacks the base of the cliffs, and removing the support of the superincumbent mass, causes the precipitation of large portions into the sea. By these two causes the sea is provided with the materials for the formation of alluvial soils. Some estimate may be formed of the violence and extent of these causes, by an examination of the present state of the German Ocean, one-fifth of which is covered by banks that appear to have been produced in the same way as the alluvial soils on the northern coast of Germany.

Water, then, is a most powerful agent in the destruction and production of rocks, and were there no conservative principle, the changes that are going on would be more extensive than they are in the present day. The floods to which some rivers are subject, are so impetuous that they frequently sweep away all opposing objects, and involve an entire district in ruin. These effects, however, are much more common in countries that are thinly covered by vegetation than in those where it is luxuriant, for it acts as a conservative agent, increasing the power of the resistance, by binding the soil more closely together. This, therefore, will account for the diminished influence of floods upon lowlands, and for the frequent deposition of rich and fertile alluvial soils.

The composition of the alluvial soils that have been brought under cultivation is exceedingly various, but they are generally remarkable for their fertility, and are admirably suited for pasture lands. "In general," says Sir Humphrey Davy, "the soils, the materials of which are most various and heterogeneous, are those called alluvial, or which have been formed by the deposition of rivers; many of them are extremely fertile. I have examined

some productive alluvial soils, which have been very different in their composition. A specimen from the banks of the river Parrott, in Somersetshire, afforded me eighty parts of finely divided matter, and one part of siliceous sand; and an analysis of the former gave the following result:—

Carbonate of lime	360 parts.
Alumina	25
Silica	20
Oxide of iron	8
Vegetable, animal, and saline matter	19

"A rich soil from the neighbourhood of the Avon, in the valley of Evesham, in Worcestershire, afforded me three-fifths of fine sand, and two-fifths of impalpable matter. This last consisted of,—

Alumina	41 parts.
Silica	42
Carbonate of lime	4
Oxide of iron	5
Vegetable, animal, and saline matter	8

"A soil yielding excellent pasture, from the valley of the Avon, near Salisbury, afforded one-eleventh of coarse siliceous sand, and the finely-divided matter consisted of,—

Alumina	7 parts.
Silica	14
Carbonate of lime	63
Oxide of iron	2
Vegetable, animal, and saline matter	14."

However valuable these analyses may be to the theoretical agriculturalist, they are by no means all that is required. (See ANALYSIS.) We are in want of a still larger series, with which should be connected the character of each soil, and the plants it is most adapted to support. If we examine the analyses that are given by Davy we find the same substances entering into the composition of each soil, but in such variable proportions that, upon the usually received notions, they can hardly be conceived to be equally fertile. It may, however, happen that the composition of the soil which is well adapted for one species of plant, may be unsuited to support the existence of another. This may arise from internal organisation, or from the chemical composition which the plant may require. But however this may be, we find the alluvial soils extremely fertile, and highly productive when laid down as pastures. The great variety in their composition is easily accounted for by considering the circumstances under which they are formed. They are the products of the decomposition of rocks, and as rocks are composed of various substances, and in different proportions, it is not strange that the alluvial soils should be more heterogeneous than others.

Another striking cause of the fertility of alluvial soils will come more properly under IRRIGATION. [S. H.]

ALMEIDEA, St. Hilaire (named after J. R. P. de Almeida, a botanist who assisted A. St. Hilaire during his travels in Brazil). Almeida's Shrub. *Pentandria Monogynia*, Linnæus; *Rutaceæ*, Jussieu. Calyx short, five-parted or five-toothed; five equal, spatula-shaped petals, which are distinct, and much longer than the calyx; five stamens, alternate with the petals, the filaments being shorter than the petals, thickly bearded above the middle, and bearing line-like, heart-shaped anthers; one style; stigma bluntly five-lobed; five seed-organs, girded by a cup-shaped disk; fruit of one or two capsules, each having one or two seeds; seeds kidney-shaped; seed-lobes large, wrinkled, and having two ear-like members.—De Cand. Prod. I. 729.

1. Sharp-pointed Almeida's Plant (*A. acuminata*, St. Hilaire). A tree, a native of Brazil, varying from ten to twenty feet in height: leaves oblong-lance-shaped, acute at both ends; flowers lilac, in terminal clustered panicles; petals blunt; flower-stalks hairy; propagated by cuttings in loam, sand, and peat.—D. C. Sp. 6.

2. White-flowered Almeida's Plant (*A. alba*, St. Hilaire). A stove shrub of Brazil: leaves inversely egg-oblong and wedge-shaped, with a blunt point; flowers white, in terminal clusters; petals blunt; flower-stalks naked; propagated by cuttings in loam, sand, and peat. *Aruba alba*, Nees et Mart. Nov. Act. Bonn. XI. 175, Tab. 28.—D. C. Sp. 5.

3. Blue-flowered Almeida's Plant (*A. cærulea*, St. Hilaire). A stove tree, about ten or twelve feet high, a native of Brazil: leaves oblong, tapering at the base, blunt at the tip, sometimes having a little notch; flowers blue, in terminal clusters; petals blunt; propagated by cuttings in sand, loam, and peat. *Aruba cærulea*, Nees et Mart. Nov. Act. Bonn. XI. 174, Tab. 27.—D. C. Sp. 4.

4. Lilac-leaved Almeida's Plant (*A. lilacina*, St. Hilaire). A stove shrub, eight feet high, a native of Brazil: leaves alternate, simple, entire, lance-shaped, acute at the base; the flowers lilac, in the form of a dense panicle, like that of the lilac; petals blunt; flower-stalks covered with spreading down, and the leaf-stalks knotted above; propagated by cuttings in loam, sand, and peat.—D. C. Sp. 1.

5. Long-leaved Almeida's Plant (*A. longifolia*, St. Hilaire). A stove shrub or tree, a native of Brazil: leaves alternate, simple, entire, lance-shaped, oblong, blunt at the base, acute at the tip; the flowers in compound terminal clusters; petals blunt; flower-stalks downy; leaf-stalks knotted above; propagated by cuttings in loam, sand, and peat —D. C. Sp. 3.

6. Thousand-spined Almeida's Plant (*A. myriacantha*, Nees von Esenbeck). A stove tree, twenty feet high, a native of Brazil: leaves scattered, elliptic-lance-shaped, pointed, veiny, wrinkled, and on short stalks; flowers white, fragrant, in axillary clusters, which are simple, five to ten-flowered; stamens five, attached to the tube of the corolla; seed-organ covered with starry hairs; propagated by cuttings in loam, sand, and peat.—Nees in Schl. Lin. V. 56.

7. Red-flowered Almeida's Plant (*A. rubra*, St. Hilaire). A stove tree, about twelve feet high, a native of Brazil: leaves alternate, simple, entire, lance-shaped, acute at the base; flowers red, in compound terminal clusters; petals very blunt; flower-stalks smooth; leaf-stalks knotted above; propagated by cuttings in loam, sand, and peat.—D. C. Sp. 2.

[A. C.]

ALMOND. A well-known fruit of commerce, of which there are two varieties, the *Bitter Almond* and the *Sweet Almond*, the produce of the Almond Tree.

ALMOND TREE (*Amygdalus*, Linnæus). More than one species, and several varieties, of this well-known genus are cultivated in this country, chiefly for the beauty of their early spring flowers, whichdid not escape the poetical eye of Spenser, and is introduced in a fine description of Prince Arthur's plumed helmet:—

"Upon the top of all, his lofty crest,
A bunch of hairs discolour'd diversely,
With sprinkled pearl and gold full richly drest,
Did shake, and seem'd to dance for jollity,
Like to an almond tree ymounted high,
On top of green Selinis all alone,
Whose tender locks do tremble every one,
At every little breath that under heaven is blown."—FAERIE QUEENE.

The common Almond Tree (*Amygdalus communis*, Linnæus) is a native of Northern Africa, and so late as the time of Cato had not been introduced into Italy, as he calls the fruit Greek nuts (*nuces Græcæ*). It was introduced into Britain about 1548. It will grow to the height of twenty or thirty feet, dividing into a head of numerous spreading branches. The leaves very much resemble those of the peach, but they proceed from buds both above and below the flowers. There are also small glands on the lower saw-toothing of the leaves. The form of the flowers is not very different from those of the peach, but they come out usually in pairs, and vary more in their colour, from the fine blush of the apple blossom to a snowy whiteness. The chief obvious distinction is in the fruit, which is flatter, with a leather-like covering, instead of the rich pulp of the peach and the nectarine, and it also opens spontaneously when the kernel is ripe. The shell of the almond is never so hard as a peach stone, and is sometimes even tender and exceedingly brittle. It is flatter, smoother, and the furrows or holes are more superficial than those of the peach stone. [B. E.]

VARIETIES OF THE COMMON ALMOND.

1. The nuts about an inch and a quarter long, with a hard smooth shell; the kernel not valuable. The seedlings are used in France to bud peaches upon.
2. Bitter: fruit of a large size.
3. Bitter: with a tender shell; fruit of a large size.
4. Bitter: with a hard shell; fruit of a large size.
5. Sultan: fruit of a small size.
6. Grand Sultan: fruit of a small size.
7. Sweet: with a tender shell, or Tender-shelled Sultan; fruit of a moderate size.
8. Sweet: with a half-hard shell.
9. Sweet: with a hard shell.
10. Long-fruited: hard-shelled; fruit of a large size.
11. Peach Almond: fruit of a large size.
12. Brittle: fruit of a moderate size.

We are not certain whether the French varieties, called, 1. *Amande douce à coque dure*; 2. *Amande douce à coque tendre*; 3. *Amande des dames*; and 4. *Amande Princesse*, coincide with any of the preceding.

The whole of the varieties generally produce a profusion of blossoms, which vary a little in colour from a fine rose to a pale blush. They closely resemble each other in foliage, the principal distinction being in the fruit, which differs either as to its form, its size, or its taste.

In the South of Europe, as in France, Spain, Portugal, and Italy, the Almond is cultivated very extensively as a standard fruit tree, the varieties there being far more numerous than in this country; while the tree also grows more vigorously. They export the fruit to every quarter of the globe.

The kernel of the Almond is the part used, and when it is green, ripe, or dried, it furnishes a most agreeable addition to the desert. It is also used to a very great extent in confectionery, perfumery, cookery, and medicine.

The general purpose of introducing the tree into our gardens and pleasure grounds in this country, is for the great beauty of its blossoms, which are not only handsome, but being produced in such profusion as they usually are at so early a period of the spring season, before the foliage appears, become extremely conspicuous and highly ornamental; a circumstance which renders the tree a most desirable shrubby plant, and causes it to be very justly esteemed.

"Whether planted singly, or in an open place," says Marshall, "or mixed with others in clumps, or shrubbery quarters, and the like, it shows itself one of the finest flowering trees in nature. Those who never yet saw it, may easily conceive what a noble appearance this tree must make when covered all over with a bloom of a delicate red, which will be in March; a time when very few trees are ornamented either with leaves or flowers. No ornamental plantation, therefore, should be without almond trees. It is not, however," he continues, "so proper to plant the white flowering variety singly in open places, or near windows, for the show of its flowers; for although they come out early, yet the whole bloom is subject to be taken off by one night's nipping weather, which frequently happens at this season. Its station, therefore, should be in shrubbery quarters, in well-sheltered places; and in such it will flower exceedingly well, and show its white blossoms to great advantage."

The foliage of the almond tree so very much resembles that of the cultivated peach tree, as to render it of a pleasing appearance independently of its fine blossoms.

In the warmer parts of Britain, such as Devonshire, the fruit will arrive at maturity, in the most favourable seasons, even when cultivated as a standard tree. This more particularly happens with the dwarf growing kinds; for the whole plant being near the ground, a more powerful influence of warmth is afforded it than can be received at a greater elevation and more open exposure. Hence it is, that the fruit bearing shoots become more perfected, and there is a greater certainty of a crop of fruit, which also is more likely to ripen. It rarely comes to maturity, however, in the vicinity of London.

The common Almond, and its varieties, blossom earlier than the dwarf kinds, from which circumstance the blossoms of the latter are very rarely damaged by spring frosts, but the other kinds, when planted in situations sheltered from the east winds, are generally preserved from sustaining damage.

When it is desired to keep the fruit for a considerable time, it should be gathered when thoroughly ripe, be well dried, and then packed in earthen jars, imbedded in dry sand, or even without sand if the vessel be tied closely down with a bladder cover. The jars should not be kept in a hot situation, but a cool one, not liable to damp.

Propagation.—All the species and varieties are propagated by seeds, budding, grafting, layers, and occasionally they will produce suckers, which may be successfully planted out. When stocks for budding or grafting upon are wanted, or new varieties desired, these are obtained by sowing the fruit stones, though they may be budded or grafted on mussel-plum stocks.

The stones of the last season's produce should be sown in October, upon a bed of light rich soil, about three inches apart, and covered four inches deep with fine soil. This is indispensable; for when the soil is left in lumps the shoots are often forced into a crooked direction, and this causes the trunk to be deformed, and unfit to become a fine tree. When the surface of the seed bed has been smoothed, a covering of rotten tanner's bark, or leaf-mould, to the depth of two inches, must be laid upon it, which being light, prevents the fruit-stones from being damaged by any severity of winter. At the beginning of May this covering of bark or leaves must be raked clean off the bed.

The stones might be reserved till spring and be sown at the end of March, but the plants do not come so certainly as when sown in autumn. An additional advantage of an autumn sowing is, that the plants come up in the spring about six weeks or two months earlier than those sown in spring; consequently the plants become vigorous and well rooted the first year, and thereby not liable to be thrown out of the ground by thaws succeeding frost in the following winter.

During summer, care must be taken to pull up all weeds when very young, for if they be allowed to get strong before pulling out, this operation is apt to injure the roots of the almond plants.

When Almond stones have been sown in spring, it will be necessary at the approach of the succeeding winter to have the beds covered with rotten tanner's bark, or leaf mould, scattering it an inch deep, or more, amongst the plants, a covering which will tend to prevent the plants being injured or thrown out by frost.

In the second spring after the sowing, the plants should be taken up, carefully preserving all the fibrous roots, a care which, as they are but sparingly produced, will be essentially necessary. The plants must be transplanted in rows, at two feet apart, row from row, and a foot and a half distant in the rows. Here they may be trained to form standards, half standards, or dwarfs, and be regulated and prepared either for wall training or shrubbery plantations. For both purposes, attention will be requisite during summer and winter, to thin out the branches, reserving only a suitable number for the future limbs of the tree, and these so far apart that they may not, in any future stage of growth, be liable to rub against each other, which standard trees would be liable to; for if this be not avoided, gum would be exuded at such injured parts and the speedy decay of the tree be the consequence.

Almond plants intended for training against walls should have some stakes fixed in the form of a trellis, to which the branches should be secured in a proper form, so that they may be suited to the position of the wall on their final removal.

When it is desired to perpetuate any particular sort, this is generally done by grafting or budding: the latter mode is far preferable, as the plants form better shaped heads and of a more vigorous character than when grafted. The proper season for budding is about the end of July, the young wood being then sufficiently strong to furnish good plump buds, and the buds of the sort desired to increase being so far matured, the wood will readily separate from the bark, and the bud be left entire. The stocks should not be stronger than from a quarter to half an inch in diameter at the part where the bud is inserted, so that for dwarf plants, two-years transplanted stocks will be strong enough; and as standards require the insertion of the buds at a few feet from the ground, four-years transplanted stocks will generally be necessary.

When Almond Trees are propagated by grafting, the operation is performed at the beginning of March, the scions having been cut off the parent plant for two or three weeks previous to the time of grafting, and if stuck into some clay or puddle to keep them fresh, will far more readily unite to the stock when grafted, than if they had been allowed to remain on the tree till wanted for the operation. When it is perceived that the buds, or grafts have taken, which in each is indicated by the production of a shoot or shoots, the bandages which secured them should be loosened a little, in order to admit of the union being securely effected by an increased growth of the parts. In the spring, after the budding has been effected, the heads of the stocks must be cut down to about an inch from the bud, letting the slope of the cut be in the contrary direction to the bud. If during the first season any bud should have flushed and produced a vigorous shoot, the head of the stock might then be cut off; but this will rarely be the case, nor is it at all desirable, as the young shoots would come very tender, and would thereby be liable to be damaged by the severity of winter. As the young shoots of either grafts or buds push forth, they should be secured to some support, to prevent them being broken off by wind or other accidental cause.

When propagated by layers, this is effected by bending a young and vigorous shoot to the ground, and layering it in the usual manner, as is done with carnations and rhododendrons. The proper time is early in spring, before the buds begin to push. Layers will root sufficiently to admit of taking off the parent plant the subsequent spring.

When increased by suckers, which are readily obtained from some of the single flowering kinds, they are carefully separated from the tree about the first week in March, and then transplanted to a desirable situation.

Final Planting.—The best time for the final planting of Almond Trees is either early in autumn, or early in spring, just before the buds burst forth. Whether the trees are planted in a shrubbery or against a wall, they delight in a loamy soil, upon a dry sub-soil. They should always be planted shallow, so that the roots may have the benefit of sun, air, and moisture; circumstances essentially necessary, if blossoms or fruit be desired; as by this means both will be produced in much greater abundance than when planted deep. Those trees planted in shrubberies will, in consequence of this shallow planting, require to be supported by stakes, for a year or two, till they become established in the soil. If this precaution be not taken, the roots are not only liable to be loosened by violent winds, but very frequently broken; and as is the case with all stone fruit-trees, disease is thus generated, from which the plants so damaged seldom or ever recover.

As the trees planted in shrubberies increase in size, they usually produce numerous branching heads, which will require thinning, so as to keep them from being so crowded as to chafe against each other.

Culture when trained against a wall.—The most suitable method of training the Almond Tree upon a wall, is the fan-shape, the principal branches being so regulated as to resemble the spokes of a fan. In the formation of the tree, the branches must be regulated in pruning and hand dressing, so as to select a sufficiency of well-placed shoots, and so that the intermediate parts of the tree be regularly furnished with lateral branches and shoots. In effecting this object, it will sometimes occur that a very luxuriant shoot pushes forth, takes the lead, and robs the contiguous part of the tree. Immediately on discovering such a shoot, it must be cut clean away. In May, all young shoots, not required for giving the tree a proper form, must be rubbed off; and as those which are retained push forth, they must be secured in a regular manner to the wall. The heads of all the shoots must be cut off the last week in September, shortening them one-third at least; and any that will not be required for the summer formation of the tree must be cut clean away, so that little cutting will be required in the winter regulation and pruning of the tree. This attention, at the end of summer, very materially contributes to the fruitfulness and permanency of the tree.

The tree having arrived at a bearing state, the young fruit will be about the size of a horse bean by the middle of May. At this period all new shoots springing from a shoot of last year's wood must be rubbed off, excepting the top and bottom shoots, provided there be not fruit situated at the base of such a shoot, in which case, instead of rubbing it off entire, the head must be pinched off, so as to leave it not more than half an inch long. The lowest and uppermost shoots are the only shoots that should be permitted to remain entire and push forward, and as these proceed they must be secured to the wall by placing over them smooth raspberry canes. If the canes used are not smooth, they will seriously injure the young wood, by their prickles chafing against the tender bark.

The first week in July, if thinning of the fruit be necessary, it must be done, leaving one about every four inches. The leading shoots left undisturbed in May must now be cut back to about an inch long. This causes the fruit to become much finer than if such shoots were kept growing till winter. If the tree should not have filled its allotted space, all the leading shoots at the extremities of the tree much be left untouched, and afterwards trained in.

About the middle of September, the shoots which were left entire in July, must now be regulated by cutting them back to about one-half their length. The shortening of the shoots at this time throws the vigour of the tree into the buds which are to be the fruitful ones for next year, and by this attention a certain crop of fruit the following year may be calculated upon, unless casualties, such as frost, should prevent it.

The winter pruning of the Almond trees must be done as early as the end of October, taking care to cut clean away all foreright short spurs that may be upon the trees. Such side spurs as may be upon the two or three year old wood may be left, since they will be productive of fruit the next season; but after they have borne fruit once, cut them clean away.

The only regulation of the shoots which will now be required, is to thin out decayed or damaged parts, and where it is discovered that a good supply of young wood is situated near the origin of the main limbs, some more distant portions of wood must be cut out, so as to give strength to what remains.

If the tree be attacked with green flies (*Aphides*) early in spring, they may in general be easily destroyed with a sprinkling of tobacco water. [T. H.]

ALNUS, Tournefort (in Latin, *Alnus*). Alder. *Monœcia Tetrandria*, Linnæus; *Amentaceæ*, Jussieu. The flowers collected into tiled catkins; male flower, scale of the catkin three-lobed, with three flowers; calyx single, four-parted; female flower, scale of the catkin rather three-parted, with two flowers; no calyx nor corolla; styles two; nut two-celled, two-seeded.—Spreng. Syst. Veg. III. 848.

1. Canadian Alder (*A. Canadensis*, Loddiges). An ornamental tree, twenty feet high, from Canada: flowers, without petals, from May to July; propagated by layers in common soil.

2. Heart-leaved Alder (*A. cordifolia*, Tenore). An ornamental tree, about twenty feet high, from Naples in 1818: leaves heart-egg-oblong, pointed, rather toothed, shining; the axils of the ribs velvety beneath; propagated by layers in common soil. *Betula cordata*, Loiseleur Deslongchamps.—Bot. Cab. 1231; Spreng. Sp. 9.

3. Rusty-leaved Alder (*A. ferruginea*, Kunth). A tree of New Grenada: leaves roundish, egg-oblong, pointed, irregularly toothed, shining above, rusty beneath; propagated by cuttings in common soil.

4. Sea-green Alder (*A. glauca*, Michaux). An ornamental tree, above twenty feet high, from North America in 1820: leaves oblong, pointed, doubly-toothed, sea-green beneath; the axils of the ribs naked; leaf-scales (*stipulæ*) lance-shaped; flowers, from May to June, without petals; propagated by layers in common soil.—Spreng. Sp. 4.

5. Clammy Alder (*A. glutinosa*, Linnæus). A British tree, twenty-five feet high, common about watery places:

leaves inversely egg-oblong, roundish, bluntly lobed, toothed, clammy; downy in the axils of the ribs beneath; flowers, in March and April, without petals; propagated by layers in a moist soil. *Betula Alnus*, Linnæus.—Eng. Bot. 1508; Spreng. Sp. 1.

Var. a. Fringe-leaved (*A. laciniata*). The leaves fringed. A native of Britain.

Var. b. Variegated-leaved (*A. foliis variegatis*). The leaves variegated. A native of Britain.

Var. c. Oak-leaved (*A. quercifolia*). The leaves resembling the oak-leaf. A native of Britain.

Var. d. Cut-leaved (*A. incisa*). The lobes of the leaves cut. A native of Britain.

Var. e. Notch-leaved (*A. emarginata*). The leaves having a small notch at the end. A native of Britain.

6. Hoary Alder (*A. incana*, Willdenow). An ornamental tree, about twenty feet high, from Austria, Russia, North America, and Europe, introduced in 1780: leaves oblong, pointed, doubly-toothed, clothed with hoary down beneath; the axils of the ribs naked; leaf-scales (*stipulæ*) lance-shaped; flowers, in June, without petals; propagated by layers in loam and peat. *Betula Alnus, var. β*, Linnæus; *B. incana*, Linn. Sup.; *B. Japonica*, Thunberg.—Spreng. Sp. 3.

Var. a. Angular-leaved (*A. angulata*). The leaves somewhat angular. Native country unknown.

Var. b. Wing-leaved (*A. pinnata*). The leaves winged. A native of Europe.

7. Mexican Alder (*A. Jorullensis*, Kunth). A tree of Mexico: leaves egg-oblong, pointed, irregularly toothed at the end, smooth above, brown and downy beneath; propagated by layers in common soil.

8. Long-fruited Alder (*A. macrocarpa*, Loddiges). An ornamental tree, twenty feet high: fruit very long; flowers, from May to July, without petals; propagated by layers in common soil.

9. Long-leaved Alder (*A. macrophylla*, Desfontaines). An ornamental tree, twenty feet high, from Naples: leaves very long; flowers, without petals, from May to July; propagated by layers in common soil.

10. Nepal Alder (*A. Nepalensis*, D. Don). An ornamental tree from Nepal: leaves oval, pointed, notched, sea green beneath; the male catkins in terminal panicles; the female catkins in axillary clusters.—Spreng. Sp. 6.

11. Oblong-leaved Alder (*A. oblongata*, Willdenow). An ornamental tree, about twenty feet high, from the south of Europe in 1730: leaves oblong, bluntish, toothed, clammy; the axils of the ribs naked; flowers, in July, without petals; propagated by layers in moist soil. *Betula oblongata*, Aiton.—Spreng. Sp. 2.

Var. a. Elliptic-leaved (*A. elliptica*). The leaves elliptic or oval.

12. Hawthorn-leaved Alder (*A. oxyacantha*, Loddiges). An ornamental tree, twenty feet high: flowers, without petals, from May to July; propagated by layers in common soil.

13. Dwarf Alder (*A. pumila*, Noisette). An ornamental tree, ten feet high: flowers, without petals, from May to July; propagated by layers in common soil.

14. Red Alder (*A. rubra*, Desfontaines). An ornamental tree, twenty feet high: flowers, without petals, from May to July; propagated by layers in common soil.

15. Wrinkled Alder (*A. rugosa*, Sprengel). A tree of North America: leaves egg-oblong, pointed, doubly-toothed, wrinkled beneath; the axils of the ribs slightly hairy. *Betula rugosa*, Ehrhart.—Spreng. Sp. 8.

16. Saw-leaved Alder (*A. serrulata*, Willdenow). An ornamental tree, twenty feet high, from North America in 1769: leaves oval-oblong, narrowing at each end, saw-toothed; the ribs beneath, and the leaf-stalks rather hairy; leaf-scales (*stipulæ*) oval, blunt; flowers, in March, without petals; propagated by layers in loam and peat. *Betula serrulata*, Aiton; *Alnus serrulata*, Michaux.—Spreng. Sp. 7.

17. Roundish-leaved Alder (*A. subrotunda*, Desfontaines). An ornamental tree, twenty feet high: flowers, without petals, from May to July; propagated by layers in common soil.

18. Wave-leaved Alder (*A. undulata*, Willdenow). An ornamental tree, about twenty feet high, from Canada in 1782: leaves egg-oblong, pointed, irregularly toothed, waved; the ribs beneath slightly hairy; leaf-stalks slightly hairy; leaf-scales (*stipulæ*) egg-oblong; flowers, in May and June, without petals; propagated by layers in loam and peat. *Betula crispa*, Aiton; *Alnus crispa*, Michaux. [A. C.]

ALOE, Linnæus (from *Alloeh*, its Arabic name). *Hexandria Monogynia*, Linnæus; *Hemerocallideæ*, Jussieu.

1. A. humilis, 9. 2. A. maculata, 30. 3. A. recurva, 12. 4. A. retusa, 13. 5. A. rigida, 14. 6. A. saponaria, 41. 7. A. variegata, 44.

Flower tubular, with a six-cleft, spreading mouth; stamens inserted into the base of the calyx; stigma three-lobed; capsule three-celled, three-valved, many-seeded; seeds in two rows.—Spreng. Syst. Veg. II. 68.

I.

FLOWERS ORANGE OR YELLOW.

1. Taper-pointed Aloe (*A. acuminata*, Haworth). An evergreen greenhouse perennial, about three feet high, from the Cape of Good Hope in 1795: no stem; leaves line-like-lance-shaped, taper-pointed, hoary greyish, above flat, smooth, sparingly beset with thorns, beneath very warty; flowers, from March to May, orange; propagated by suckers in sandy loam. *A. humilis*, Sims.—Bot. Mag. 757.

2. White-edged Aloe (*A. albocincta*, Haworth). An evergreen greenhouse under-shrub, three feet high, native country unknown, introduced in 1812: plant polished, sea green; leaves oblong, taper-pointed, with a deep white, entire, gristly edge; flowers, in June, orange; propagated by suckers in sandy loam.

3. Bearded Aloe (*A. arista*, Haworth). An evergreen greenhouse shrub, two feet high, from the Cape of Good Hope in 1801: many leaved; flowers, in May and June, orange; propagated by suckers in sandy loam.

4. Short-leaved Aloe (*A. brevifolia*, Haworth). An evergreen, greenhouse, under-shrub, four feet high, from the Cape of Good Hope in 1810: leaves short; flowers in June and July, orange; propagated by suckers in sandy loam.

5. Grey Aloe (*A. cæsia*, Salm). An evergreen, greenhouse shrub, about two feet high, from the Cape of Good Hope in 1818: leaves lance-shaped, oblong, somewhat bent backward at the tip, greyish; the edges at the tip with red thorns; flowers, in July, orange; propagated by suckers in sand and loam.—Spreng. Sp. 73.

Var. a. Taller Grey Aloe (*A. elatior*, Haworth). A variety, about nine feet high, with red flowers; a native of the Cape of Good Hope.

6. Chinese Aloe (*A. Chinensis*, Haworth). An evergreen, greenhouse shrub, about three feet high, from China in 1821: leaves upright and spreading, smooth, soft, straight, and of a pale green colour; flowers yellow; propagated by suckers in loam.

7. Flat-leaved Aloe (*A. depressa*, Haworth). An evergreen, greenhouse shrub, about six feet high, from the Cape of Good Hope in 1731: leaves egg-oblong, pointed, hoary grey, with tubercles beneath; margins and keel gristly; thorns white, not united at the base; flowers, in August, orange; propagated by leaves in sand and loam. *A. serra*, Willdenow.—Bot. Mag. 1832. Spreng. Sp. 54.

8. Slender Aloe (*A. gracilis*, Haworth). An evergreen, greenhouse, under shrub, three feet high, from the Cape of Good Hope in 1832: leaves slender; flowers, in June and July, orange; propagated by suckers in sandy loam.

9. Humble Aloe (*A. humilis*, Thunberg). An evergreen greenhouse perennial, about one foot high, from the Cape of Good Hope in 1731: no stem; leaves oblong-lance-shaped, awl-shaped, above swollen, beneath warty; flowers, from March to June, orange; the petals equal; propagated by suckers in sand and loam.—De Cand. Pl. Hist. Suec. 39. Spreng. Sp. 51.

10. Incurved Aloe (*A. incurva*, Haworth). An evergreen greenhouse perennial, one foot high, from the Cape of Good Hope in 1796: flowers, from March to June, orange; propagated by suckers in sandy loam. *A. humilis β incurva*. —Bot. Mag. 828.

11. Proliferous Aloe (*A. prolifera*, Salm). An evergreen greenhouse shrub, about two feet high, from the Cape of Good Hope in 1819: leaves lance-shaped, pointed, hoary grey, rather tubercled beneath; edges and keel beset with thorns; flowers, from March to June, orange; propagated by suckers in sand and peat. *A. brevifolia*, Willdenow.—Spreng. Sp. 53.

12. Recurved Aloe (*A. recurva*, Haworth). An evergreen frame perennial, one foot high, from the Cape of Good Hope in 1795: leaves awl-shaped, recurved, concave, flowers, in August, grey; propagated by cuttings.—Bot. Mag. 1353.

13. Smooth Cushion Aloe (*A. retusa*, Willdenow). An evergreen frame perennial, one foot high, from the Cape of Good Hope in 1720: leaves in six rows, bluntly notched; flowers, from May to July, grey; propagated by suckers.—Bot. Mag. 455.

14. Stiff Aloe (*A. rigida*, De Candolle). An evergreen greenhouse shrub, one foot high, from the Cape of Good Hope in 1794: almost stemless; leaves green, unspotted; flowers, from May to September, grey; propagated by cuttings.—D. C. Plant. Gr. Pl. 62.

15. Slim Aloe (*A. tenuior*, Haworth). An evergreen greenhouse under shrub, two feet high, from the Cape of Good Hope in 1821: flowers in July and August, yellow; propagated by suckers in sandy loam.

16. Prickly Aloe (*A. tuberculata*, Haworth). An evergreen, greenhouse perennial, two feet high, from the Cape of Good Hope in 1796: no stem; leaves oblong, lance-shaped, taper-pointed, slightly hollow above, very warty, tubercular, and all over beset with prickles like a hedge-hog; flowers, from March to May, orange; propagated by suckers in sand and loam.—Spreng. Sp. 49.

17. Apple-green Aloe (*A. virens*, Haworth). An evergreen greenhouse perennial, about three feet high, from the Cape of Good Hope in 1790: almost stemless; leaves oblong-lance-shaped, green, sparingly spotted, the edges beset with few hooked, green thorns; flowers, in August and September, yellow; propagated by suckers in loam. — Bot. Mag. 1355. Spreng. Sp. 52.

18. Common Aloe (*A. vulgaris*, De Candolle). A greenhouse evergreen shrub, about two feet high, from Greece, Syria, and the West Indies, introduced in 1596: leaves lance-shaped, spreading, smooth, somewhat bent backward at the tip; thorns at the edge; flowers, from May to August, on branched stalks, yellow; propagated by suckers in sand and loam. *A. Barbadensis*, Haworth.—Spreng. Sp. 60.

19. Yellow-thorned Aloe (*A. xanthacantha*, Willdenow). An evergreen, greenhouse shrub, about three feet high, from the Cape of Good Hope in 1817: leaves egg-oblong, acute, smooth, spreading, edges and back thorny; thorns yellowish; flowers, in June, orange; propagated by suckers in sand and loam.—Spreng. Sp. 85.

II.

FLOWERS PINK, RED, OR SCARLET.

20. White-thorned Aloe (*A. albispina*, Haworth). An evergreen greenhouse shrub, seven feet high, from the Cape of Good Hope in 1796: leaves egg-oblong, pointed, green; the edges and keel very thorny; thorns very long and white; flowers, in June and July, scarlet; propagated by layers in sand and loam.—Spreng. Sp. 83.

21. Tree-like Aloe (*A. arborescens*, De Candolle). An evergreen greenhouse shrub, about twelve feet high, from the Cape of Good Hope in 1731: stem lofty; leaves lance-shaped, stem clasping, sea-green, spreading, their ends bent backwards; the thorns on the edges green; the lower leaves very close; flowers, from March to November, red; propagated by cuttings in sand and loam. *A. perfoliata*, *var. β*, Linnæus.—Bot. Mag. 1305, Spreng. Sp. 77.

22. Fringed Aloe (*A. ciliaris*, Haworth). An evergreen greenhouse under shrub, five feet high, from the Cape of Good Hope in 1821: flowers, in June and July, red; propagated by suckers in sandy loam.

23. Forked Aloe (*A. dichotoma*, Linnæus). An evergreen greenhouse shrub, eight feet high, from the Cape of

Good Hope in 1780: stems branching in pairs; leaves lance sword-shaped, rather sharp-toothed, hoary-grey; flowers red, in panicled spikes; stamens longer than the corolla; propagated by leaves in sand and loam.—Spreng.

24. Distant Aloe (*A. distans*, Haworth). An evergreen greenhouse shrub, about six feet high, from the Cape of Good Hope in 1732: leaves distant, upright, spreading, egg-oblong, acute; thorns of the margin few, large, yellow; flowers in August, red; propagated by suckers in sand and loam.—Bot. Mag. 1362. Spreng. Sp. 87.

Var. a. Reflexed (*A. reflexa*, Salm.) The leaves bent backward. A native of the Cape of Good Hope, introduced in 1820.

Var. b. Depressed (*A. depressa*, Haworth). The leaves as if pressed downwards. From the Cape of Good Hope in 1820.

25. Yellow Aloe (*A. flavissima*, Haworth). An evergreen greenhouse shrub, about five feet high, from the Cape of Good Hope in 1793: leaves oblong, pointed, hoary-grey; flowers, in August, red; propagated by suckers in sand and loam.—Spreng. Sp. 82.

26. Shrubby Aloe (*A. frutescens*, Salm). An evergreen greenhouse shrub, about five feet high, from the Cape of Good Hope in 1819: stem low; leaves distant, line-like, lance-shaped, spreading, sea-green; flowers, in June and July, red; propagated by suckers in sand and loam.—Spreng. Sp. 76.

27. Sea-green Aloe (*A. glauca*, Haworth). An evergreen greenhouse shrub, about four feet high, from the Cape of Good Hope in 1731: leaves hoary grey, oblong, lance-shaped, streaked, the edges beset with red thorns; flowers, from January to September, red; propagated by suckers in sand and loam. *A. rhodacantha*, De Candolle.—Spreng. Sp. 57.

Var. Lesser red-thorned (*A. rhodacantha*, Bot. Mag.) from the Cape of Good Hope in 1731.—Bot. Mag. 1278.

28. Broad-leaved Soap Aloe (*A. latifolia*, Haworth). An evergreen greenhouse shrub, about six feet high, from the Cape of Good Hope in 1795: leaves egg-oblong, lance-shaped, pale green, with slightly whitish spots; the thorns of a rusty colour; flowers, in July and August, scarlet; propagated by suckers in sand and loam. — Bot. Mag. 1346.

29. Lined Aloe (*A. lineata*, Haworth). An evergreen greenhouse shrub, about five feet high, from the Cape of Good Hope in 1789: leaves line-like, green; thorns red; flowers scarlet; propagated by suckers in sand and loam.

Var. a. Glaucescent (*A. glaucescens*, Haworth). An evergreen greenhouse shrub, four feet high, from the Cape of Good Hope in 1789: plant glaucescent, or somewhat sea-green; flowers scarlet; propagated by suckers in sandy loam.

30. Spotted Aloe (*A. maculata*, Hort. Kew.). An evergreen stove shrub, three feet high, from the Cape of Good Hope in 1759: leaves smooth, pointed, in form of a tongue; flowers, from July to August, red, in curved, nodding clusters; propagated by cuttings. *Gasteria maculata*, Haworth.

31. Mitre-formed Aloe (*A. mitræformis*, Linnæus). An evergreen greenhouse shrub, six feet high, from the Cape of Good Hope in 1732: leaves egg-oblong, pointed, somewhat of a hoary grey appearance, below covered with small thorns; flowers, in August, red; propagated by suckers in sand and loam.—Bot. Mag. 1270.

32. Noble Aloe (*A. nobilis*, Haworth). An evergreen greenhouse shrub, about six feet high, from the Cape of Good Hope in 1800: leaves upright, broadly egg-oblong; pointed; thorns of the margin, numerous, white; flowers, in August, red; propagated by suckers in sand and loam.

33. Obscure Aloe (*A. obscura*, Haworth). An evergreen greenhouse shrub, about two feet high, from the Cape of Good Hope in 1819?: leaves oblong, lance-shaped, hoary-greyish, with oblong roundish spots, the edges beset with very oed thorns; flowers, in July and August, red; propagated by suckers in sand and loam. *A. picta*, De Candolle.—Bot. Mag. 1323. Spreng. Sp. 67.

Var. a. More Sea-green (*A. glaucior*, Haworth). An evergreen greenhouse under shrub, two feet high, from the Cape of Good Hope in 1819: plant glaucescent; flowers, in July and August, red; propagated by suckers in sand and loam.

Var. b. Large-toothed (*A. magnidens*, Haworth). An evergreen greenhouse shrub, three feet high, from the Cape of Good Hope in 1820: teeth large; flowers, in June and July, red; propagated by suckers in sandy loam.

34. Palish Aloe (*A. pallescens*, Haworth). An evergreen greenhouse under-shrub, three feet high, from the Cape of Good Hope in 1820: flowers, in June and July, red; propagated by suckers in sandy loam.

35. Panicled Aloe (*A. paniculata*, Jacquin). An evergreen greenhouse shrub, five feet high, from the Cape of Good Hope in 1795: leaves egg-oblong, flat, hoary grey, streaked, the edges gristly, and scarcely toothed; flowers, scarlet; propagated by cuttings in sand and loam. *A. striata*, Haworth; Jacquin's Frag. Bot. 62. Spreng. Sp. 58.

36. Many-toothed (*A. pluridens*, Haworth). An evergreen greenhouse shrub, two feet high, from the Cape of Good Hope in 1823: leaves many-toothed; flowers, from February to April, red; propagated by suckers in sandy loam.

37. Common Soap Aloe (*A. saponaria*, Haworth). An evergreen greenhouse shrub, about four feet high, from the Cape of Good Hope in 1727: leaves oblong, lance-shaped, dull green, rather hoary grey, with large spots running across the leaves; thorns of a rusty colour; flowers, in July and August, red; propagated by suckers in sand and loam. —Bot. Mag. 1460.

Var. a. Yellow-streaked (*A. luteo-striata*, Haworth). An evergreen greenhouse shrub, four feet high, from the Cape of Good Hope in 1821: flowers, in July and August, red; propagated by suckers in sandy loam.

38. Little-toothed Aloe (*A. serrulata*, Hort. Kew). An evergreen greenhouse shrub, seven feet high, from the Cape of Good Hope in 1789: leaves egg-oblong, lance-shaped, spotted, with the edges and keel beset with little teeth at the end; flowers, in July and August, red; propagated by suckers in sand and loam.—Spreng. Sp. 63.

39. Socotrine Aloe (*A. Socotrina*, De Candolle). An evergreen greenhouse shrub, twelve feet high, from Socotora in 1731: stem branching in pairs; leaves sword-lance-shaped, erect, somewhat spotted; edges drooping, white, with straight lines; flowers, in February, March and April, red; propagated by cuttings in sand and loam.—Bot. Mag. 472. Spreng. Sp. 69.

40. Spike-flowered Aloe (*A. spicata*, Linnæus). An evergreen greenhouse shrub, four feet high, from the Cape of Good Hope in 1795: leaves sword-shaped, spotted with white, toothed; marginal thorns middle sized, red; flowers, in spikes, red; propagated by suckers in sand and peat.—Spreng. Sp. 72.

41. More-thorny Aloe (*A. spinosior*, Haworth). An evergreen greenhouse under-shrnb, four feet high, from the Cape of Good Hope in 1820: very thorny; flowers, from January to September, red; propagated by suckers in sandy loam.

42. Streaky Aloe (*A. striatula*, Haworth). An evergreen greenhouse under-shrub, three feet high, from the Cape of Good Hope in 1821: flowers, in June and July, red; propagated by suckers in sandy loam.

43. Somewhat-erect Aloe (*A. suberecta*, Haworth). An evergreen greenhouse perennial, three feet high, from the Cape of Good Hope in 1789: leaves taper-pointed, flat and smooth above, warty beneath; flowers, from March to June, scarlet; propagated by suckers in sandy loam.

Var. a. Half-spotted (*A. semiguttata*, Haworth). An evergreen grreenhouse perennial, three feet high, from the Cape of Good Hope in 1819: flowers, from March to June, scarlet; propagated by suckers in sandy loam.

44. Variegated Aloe (*A. variegata*, Willdenow). An evergreen greenhouse perennial, about four feet high, from

the Cape of Good Hope in 1720: leaves arranged in ranks of thorns, tiled, spreading, egg-oblong, channelled, three-cornered, spotted, the edges and keel gristly, round-notched; flowers, from March to September, pink; propagated by suckers in sand and loam.—Bot. Mag. 513. Spreng. Sp. 62.

45. Commelin's Aloe (*A. Commelini*, Willdenow). An evergreen greenhouse shrub, about three feet high, from the Cape of Good Hope in 1819: leaves egg-oblong, narrowing at each end, spreading, sea-green, smooth above, the edges and the keel thorn-toothed beneath; thorns whitish; flowers not known; propagated by suckers in sand and loam. *A. mitræformis*, Salm.—Spreng. Sp. 84.

46. Hedgehog Aloe (*A. echinata*, Willdenow). An evergreen greenhouse perennial, about six feet high, from the Cape of Good Hope in 1821: no stem; leaves oblong-lance-shaped, beset with prickles, toothed, white beneath with warts; flowers with unequal petals; propagated by suckers in sand and loam.—Spreng. Sp. 50.

47. Purple-flowered Aloe (*A. purpurascens*, Haworth). An evergreen greenhouse shrub, about eight feet high, from the Cape of Good Hope in 1780: leaves sword-shaped, hoary grey, bent backward at the end, and the toothings of the edges white; flowers, from July to October, purple; propagated by cuttings in sand and loam.—Bot. Mag. 1474.

[A. C.]

ALOE PLANTS. The various species of Aloe are plants of very singular growth and appearance, totally unlike any of the vegetable productions of temperate climates. "The Mahometans," says Wood, in his Zoography, "respect the Aloe as a plant of a superior nature. In Egypt, it may be said to bear some share in their religious ceremonies; since whoever returns from a pilgrimage to Mecca has it over his street-door, as a proof of his having performed the holy journey. The superstitious Egyptians believe that this plant hinders evil spirits and apparitions from entering the house; and, on this account, whoever walks the streets in Cairo, will find it over the doors of both Christians and Jews. The leaves of the different species of Aloe are highly serviceable to the natives of the countries where they grow. The negroes of Senegal make excellent ropes of them, which are not liable to rot in water; and of two kinds mentioned by Sir Hans Sloane, one is manufactured into fishing-lines, bow-strings, stockings, and hammocks."

PROPAGATION AND CULTURE.

The propagation of these plants is effected in different methods, according to their nature. As many of the roots afford plentiful supplies of suckers or offsets from their roots, they may be easily raised in that way. And in those which do not possess this property, it may be often accomplished by taking off some of the under leaves. Where ripe seeds can be procured, they may also be raised in that method.

But in order to the successful cultivation of the Aloe in this climate, it is necessary that it have a proper soil prepared for it. This should be constituted of about one-half of fresh, good, light mould, which has a considerable proportion of decayed vegetable matter in it, and one-fourth part of sea-sand, or the scrapings of turnpike roads after they are become dry and of a sandy nature, with an equal quantity of the siftings of lime rubbish. These substances should be intimately incorporated and blended together by frequent turning over with the spade; and to render them perfectly mellow, and suitable for the purpose, they should be suffered to remain in this state of mixture for eight or twelve months before they are made use of.

With this earthy compost some very small pots are to be filled in a pretty close manner. The suckers, offsets, or root-leaves, are then to be planted out separately in these pots of earth, which should be slightly pressed round them. The most proper season for performing the work is about the middle of June, when the old plants are shifted. The suckers, or other parts, which are to be made use of as sets, should be taken off from the old plants with great care; and when they appear in any degree moist on the part where they were separated, it will be necessary to put them by in some dry place out of the ground for a few days before they are planted out, in order that they may be rendered so dry as to prevent their rotting; and in cases where leaves are employed, till the succulent parts that are wounded in their removal are healed over. After being planted out in the pots, they should be slightly watered, and then set in some shady situation for about a fortnight; after which the more tender sorts may be removed into a very moderate hot-bed, being plunged up to the rims. By this means they strike new root more readily. But here it will be necessary to shade the plants in the heat of the day, and to let them have as much air as possible.

Where leaf-sets are made use of, they should be planted in June, setting the part that was separated from the old plant an inch or an inch and a half into the earth. Some prefer plunging the pots immediately into the hot-bed, as in this way they push forth heads before the winter sets in.

Those plants which are preserved in stoves generally require to be watered at least once a week the greater part of the winter; while those which are kept in greenhouses, without artificial heat, do not stand in need of being watered oftener than once a month in that season.

While the hardier sorts of Aloes are set out abroad in the summer, they should have but little water given them; and when much rain falls during the time, they should be screened from it in some way or other; as, when they imbibe much wet in that season, they frequently rot the following winter, especially if they are kept in a moderate warm air: consequently, those who choose to treat the plants in a hardy manner, should be cautious of their receiving too much moisture during the summer season.

These sorts thrive much better when they are exposed in summer, and secured from the cold and rain in winter, than if they were treated more tenderly; as, when they are placed in stoves, from their being kept growing all the winter, they are drawn up weak; and though they may flower oftener when they have a moderate share of heat, in two or three years, the plants do not appear so handsome as those which are treated more hardily.

All the tender sorts should either constantly remain in the stoves, or be removed in summer to glass cases, where they may have a free admission of air in warm weather and at the same time be protected from rain and cold. In this management the plants mostly thrive and increase perfectly, and such of them as usually flower produce them in beauty at their proper seasons.

In the culture of the Aloe plant in the island of Barbadoes, Mr. Millington says, that the grounds to the distance of two or three miles from the sea, which are subject to be injured by drought, and which are so shallow and stony as not to admit of the successful planting of the sugar-cane, are found the most adapted to the raising of the Aloe plants. In preparing the land, the stones, at least the larger ones, are first picked up, and either packed in heaps upon the most shallow, barren spots, or laid round the field as a dry fence. It is then lightly ploughed, and very carefully cleared of all noxious weeds, marked with lines at one foot distance from row to row, and the young plants set, like those of the cabbage, at about five or six inches from each other. This regular mode is, however, only practised by the more exact planters, to facilitate the weeding of them by hand; as, if the plants are not kept perfectly clean, and free from weeds, the produce is very small. They bear being planted in any season of the year, even the driest, as they will live on the surface of the ground, without any rain, for many weeks. [R. M.]

ALOES. In veterinary medicine, a very important production, well known under the name of bitter, or purging aloes. It is the chief, and almost the only purgative used for the horse; but as far as regards other quadrupeds we could do very well without it. Formerly we had choice of three kinds, the Barbadoes, the Cape, and the Socotrine; but we believe the last is not now to be had. What is now sold in the shops for Socotrine is merely a compound of Barbadoes and Cape aloes. The Barbadoes aloes, as being safer, more certain, and less irritating in its operation, is generally preferred in veterinary practice. We are aware that Mr. Percival speaks of the Cape aloes as being as efficacious as the other; "and this I say," he adds, "although I myself am at present in the practice of using the Barbadoes." We confess that we have not often put the Cape aloes to the test. We early imbibed a prejudice against it; and the few instances in which we have given it a trial, have tended to confirm rather than confute much that has been urged against it. Possibly it may be more frequently adulterated than Barbadoes aloes; and if so, the different accounts we receive of it are explained. As the Barbadoes aloes is about five times as expensive as the Cape, Mr. Percival should have given us some reason why he uses the former rather than the latter.

Barbadoes aloes is easily distinguished from Cape aloes, especially when the two sorts are contrasted together. The former is tougher, browner, has a more intensely bitter taste, and has rather less flavour when breathed upon. The Cape aloes is easier broken, and presents a beautiful glossy fracture, while the fracture of the Barbadoes aloes is dull, and, if a thin piece be looked through, it has much less transparency. In short, the physical properties of Barbadoes and Cape aloes differ nearly as much as bees'-wax differs from white resin. The Barbadoes aloes receives its name from the island it is brought from. It is sent to this country in large gourd-shells; and the adherence of a portion of this shell to the aloes is a very good test of its being genuine.

Aloes has long been in use as the best purgative for the horse. When given in sufficient quantity it produces a copious discharge from the lining membrane of the stomach and bowels, acting more especially, however, upon the large intestines than on the small intestines or on the stomach. In most cases it requires about twenty-four hours to operate, though particular circumstances may hasten or retard it. Mr. Percival says he has known a dose of physic remain sixty hours before it operated. "This shows," he adds, "the impolicy, and danger even, of administering a second dose of physic at an interval of less than three or four days after the first, supposing the latter not to have taken effect."

The usual dose of aloes when wanted to produce what is called *physicking*, varies from four to eight or ten drachms. Except in certain diseases, or in peculiar constitutions, more than eight should never be given, even to the strongest horse; and, indeed, in by far the greater number of cases, this is too much. An under dose will do no harm whatever; but an overdose may, and often does destroy the horse, or it may leave him in such a state that he will be an invalid for weeks or months afterwards. Six or seven drachms, with proper management, are a full and sufficient dose for an ordinary saddle or carriage horse. Professor Coleman used to mention a horse of his own that used to be purged by three drachms of Cape aloes; "in opposition to which," says Mr. Percival, "I may set the case of a thorough-bred filly, the property of Mr. O'Connor, at Newmarket, who took, under every advantage of preparation, fourteen drachms of Barbadoes to produce purging." These are anomalous cases, and do not often occur. We have heard of a horse that was purged by six drachms after fourteen had been given without effect. Instead of increasing the dose to such a dangerous extent, it is better to try some other purgative.—(See PURGATIVES).

Small doses of Aloes, from one to four drachms, are often given merely to evacuate the contents of the bowels of the horse; and still smaller doses are given in inflammations for reducing the force and frequency of the pulse. While they do so, they at the same time produce nausea, which is often very desirable.

Mode of Administering.—Aloes may be given in either the solid or dissolved state. The former has advantages over the latter. Finely powdered, and beat up with any simple, such as syrup, soap, flour and water, or honey, aloes forms a stiff paste, which, when rolled into proper shape, may be easily placed at the root of the horse's tongue, and he will then swallow, without tasting it. It is not so easy to give the aloes in solution; and in this state it annoys and disgusts the patient; part of the solution is spilt and wasted; and, after all, no advantage of any consequence is thereby gained. It is said the solution operates quicker than in the solid form, and so in many cases it does, but not always, and the difference is but trifling, If the requisite quantity of aloes be beat up with two drachms of ginger, two drachms of flour, and four drachms of hog's lard or palm oil, it will dissolve, by the heat of the stomach, in a few minutes.

Effects of Aloes on Oxen, Sheep, and Dogs.—Cattle are sometimes griped and have their bowels slightly relaxed by aloes; but enormous doses have been given without producing any effect; and as we have an excellent substitute in Epsom salts, we do not attempt purgation in the ox by aloes. Sheep appear to be equally unsusceptible of their action. In doses from twenty to thirty, or forty grains, the dog is briskly purged by aloes; but even for this animal we have better agents in castor oil, Epsom salts, jalap, and calomel. The hog is purged by a small quantity of aloes; but it is difficult to administer; and it gripes him, and in a few cases produces prolapsus of the vent-gut (*anus*).

Compound Tincture of Aloes is made by digesting two ounces of aloes and one of gum myrrh in two pints of spirits of wine for fourteen days, strain, and it is fit for use. [C. S.]

ALOES TREE (*Aquilaria Malaccensis*, Lamarck). A lofty tree, which has no relation to the genus *Aloes*. As this tree is a native of the East Indies, Campbell has used an unwarrantable poetical licence in placing it in an American forest.

——" High in amphitheatre above
" His arms the everlasting aloes threw."—GERTRUDE OF WYOMING.

The wood of the aloes tree, also called eagle tree, ligne aloes, or wood aloes, is resinous, and has an agreeable aromatic perfume. It is so much esteemed in the east, as frequently to be sold for its weight in gold, to be burnt in censers like incense. It is this wood aloes which is mentioned in the Scriptures: " Thy plants," says Solomon, " are an orchard of pomegranates, with pleasant fruits; camphor, with spikenard; spikenard and saffron; calamus and cinnamon, with all trees of frankincense; myrrh and *aloes*, with all the chief spices." (*Canticles* iv. 14). " All thy garment," says David, in the Psalms, " smell of myrrh, and *aloes*, and cassia." Chaucer introduces it more than once in a similar manner.

" My chamber is strewed with myrrhe and incense,
With sweete savouring aloes and sinnamone
Brething an aromatike redolence."—REMEDIE OF LOVE.

Again he alludes to the bitterness of the ligne aloes, from which, probably, this wood has been called aloes:

" The woeful tears that they letten fall
As bitter werin, out of tearis kind
For paine, as is *ligne aloes* or gall."—TROILUS AND CRESSEIDE.

The Jesuit missionaries describe the aloes tree to be as tall as an olive, and similar in form. The same individual furnishes three sorts of wood: the first sort, immediately under the bark, is what our dealers would term soft wood, and is black, compact and heavy; it is this which is termed eagle-wood. The second sort, found next to the eagle-wood, is shining, darkish-coloured, and as light as touch-wood; this, termed calambouc, or calamba wood is exported to Europe, and is esteemed as an excellent perfume, burning like wax, and used for making pastiles. The third sort is what our dealers would term heart-wood, lying next the pith: this is termed tambac, and is the most valuable of all; but is rarely to be procured genuine, even in the east, the other sorts being sold instead. Most authors, in giving an account of this tree, confound its productions with the genus *Aloes*, as well as with *Agave*. [B. E.]

ALOEXYLON, Loureiro (from the Greek, ἀλοη, " the Aloe," and ξυλον, " wood," being supposed to be the Aloes-tree). Aloes-wood. (See AQUILARIA.) *Decandria Monogynia*, Linnæus; *Leguminosæ*, Jussieu. Calyx either four-parted or of four leaves; calyx-leaves acute, temporary, the lower one nearly double the length of the rest; petals five, unequal, longer than the calyx; stamens ten, distinct; seed-organ flattish, curved; style thread-shaped; pod sickle-shaped, one-seeded; seed oblong.—De Cand. Prod. Vol. II. 518.

1. Loureiro's Aloes-wood (*A. agallochum*, Loureiro). A tree, sixty-feet high, of the highest mountains in Cochin China, and of the Molucca Islands: branches erect; leaves simple, entire, lance-shaped, and alternate; flowers terminal. *Cynometra agallocha*, Sprengel.—D. C. Sp. 1. [A. C.]

ALOMIA, Kunth (from the Greek, α, " without," and λωμα, " a fringe). Fringeless. *Syngenesia Æquales*, Linnæus; *Compositæ Eupatoreæ*, Jussieu. Fence (*involucrum*) tiled; receptacle naked; fruit with scarcely any down.—Humb. Bonp. and Kunth. Nov. Pl. Gen. et Sp.

1. Ageratan Fringeless (*A. ageratoides*, Kunth). An evergreen, ornamental, greenhouse perennial, about one foot and a half high, from Mexico in 1824: stem upright, very much branched; leaves opposite, stalked, egg-oblong, saw-toothed, smooth; flowers, in June and August, white, in bunches; propagated by cuttings in sandy loam. *Ethulia ageratoides*, Sprengel, Syst. Veg. III. 458. [A. C.]

ALONSOA, Ruiz and Pavon (named in honour of *Alonso*, of Santa Fe de Bogota). Alonso's Flower. *Didynamia Angiospermia*, Linnæus; *Solaneæ*, Jussieu. Calyx divided into five parts; corolla of one petal, the limb of which is rather flat, and the tube very short, inverted, five-parted, with the upper division largest; stamens curved downwards; filaments smooth; capsule two-celled.

1. Pointed-leaved Alonso's Flower (*A. acutifolia*, Ruiz and Pavon). An evergreen, ornamental, greenhouse shrub, about three feet high, from Peru in 1790: stem herb-like, four-winged; leaves opposite, egg-oblong, deeply saw-toothed, smooth, stalked: flowers, from May to October, scarlet, on axillary, solitary, one-flowered stalks; propagated by cuttings in loamy peat. *Hemimeris Mutisii*, Bonpland.

2. Wing-stemmed Alonso's Flower (*A. caulialata*. Ruiz and Pavon). An evergreen, ornamental, greenhouse perennial, three feet high, from Chili in 1823: stem four-angled, winged at the angles; leaves opposite, egg-oblong, pointed, saw-toothed; flowers, from May to October, scarlet, on axillary, solitary, one-flowered stalks; propagated by cuttings in common earth. *Hemimeris parviflora*, Kunth.

3. Cut-leaved Alonso's Flower (*A. incisifolia*, Ruiz and Pavon). An evergreen, ornamental, greenhouse shrub, two feet high, from Chili in 1795: stem shrubby, branched; leaves egg-oblong, stalk cut, saw-toothed, the lower opposite, the upper alternate; flowers, from May to October, scarlet, on long and rather branched stalks; propagated by cuttings in sandy peat. *Celsia urticæfolia*, Curtis.—Bot. Mag. 417.

4. Intermediate Alonso's Flower (*A. intermedia*, Loddiges). A beautiful, evergreen, greenhouse under shrub, two feet high, said to be a mule between *A. incisifolia* and *A. linearis*: flowers, at all seasons, scarlet; propagated by cuttings in sandy peat.—Bot. Cab. 1456.

5. Line-leaved Alonso's Flower (*A. linearis*, Hort. Kew.) An evergreen, ornamental, greenhouse shrub, above two feet high, from Peru in 1790: stem rather shrubby; leaves in bundles, line-like, distantly toothletted; flowers, from May to October, scarlet, on branched stalks; propagated by cuttings in sandy peat. *Hemimeris coccinea*, Willdenow.

6. Procumbent Alonso's Flower (*A. procumbens*, Ruiz and Pavon). An annual of Peru: stem procumbent; leaves oblong, saw-toothed. *Hemimeris procumbens*, Persoon.

[A. C.]

ALOPECURUS, Linnæus (from the Greek, *αλωπηξ*, "a fox," and *ουρα*, "a tail"). Fox-tail Grass, *Triandria Digynia*, Linnæus; *Gramineæ*, Jussieu. Spikes one-flowered; husks two-keeled, somewhat equal, higher or lower than the flower; chaff membranaceous, flatly keeled; stamens very long, down-feathery; seed-organ (*ovarium*) smooth.

1. Field Foxtail Grass (*A. agrestis*, Linnæus). A British annual, eighteen inches high: straw erect, rather rough above; panicle somewhat spiked, cylindrical, pointed; husks acute, united as far as the middle, rather naked; common in fields and by highway sides.—Eng. Bot. T. 848.

2. Alpine Foxtail Grass (*A. alpinus*, Smith). A perennial of Spitzbergen and North America, found on Loch-na-Gar, Aberdeenshire, six inches high: straw ascending and smooth, panicle spiked, egg-oblong; awn of the husk somewhat equalling the chaff; upper sheath-leaf bellying, thrice as long as the lance-shaped leaf; blows in July and August.—Eng. Bot. 1126.

3. Antarctic Foxtail Grass (*A. antarcticus*, Vahl). Straw erect, smooth; leaves with a flat surface, short; spikes egg-oblong; husks hairy; chaff awned on the back; awn longer than the husk.

4. Bulbous Foxtail Grass (*A. bulbosus*, Linnæus). A rare English perennial, one foot high, found in salt marshes: straw erect; spikes very simple, tapering; husk acute, distinct at the base, velvety; root bulbous; blowing in June and July.—Eng. Bot. 1249.

5. Colobachean Foxtail Grass (*A. colobachnoides*, Trinius). A perennial, eighteen inches high, from Siberia in 1826: panicle egg-oblong; husks united at the base, blunt, on every side hairy; chaff blunt, somewhat hairy above; styles united.—Trin.

6. Cretan Foxtail Grass (*A. creticus*, Trinius). Panicle cylindrical; husks united even to the tip, rather blunt, fringed above; chaff furrowed; styles united.—Trin.

7. Orange Foxtail Grass (*A. fulvus*, Smith). A British perennial, one foot high, growing in ponds and ditches: straw ascending, knee-jointed; spikes compounded, cylindrical; husks blunt, fringed; awn the length of the husk, with somewhat round anthers; blows in July.—Eng. Bot. T. 1467.

8. Kneed Foxtail Grass (*A. geniculata*, Linnæus). A British perennial, one foot high, growing in marshy places; straw ascending, knee-jointed; panicle somewhat spiked, cylindrical; husk united at the base, blunt, somewhat velvety; blows in July and August.—Eng. Bot. T. 1250.

9. Woolly Foxtail Grass (*A. lanatus*, Smith). A perennial from Asia Minor: spikes in heads; husks sword-pointed, velvety; awn one-half shorter; leaves woolly.

10. Blackish Foxtail Grass (*A. nigricans*, Hornem.). A perennial of Europe, introduced in 1815: straw erect, smooth, somewhat sea-green; panicle somewhat spiked, cylindrical, blunt, shining, black; husk united beneath the middle, pointed, velvety, fringed.

11. Meadow Foxtail Grass (*A. pratensis*, Linnæus). A British perennial, two feet high, common in pastures: straw erect, smooth; panicle somewhat spiked, cylindrical, blunt, of a yellow-green colour with silvery hairs; husks united beneath the middle, pointed, velvety, fringed; blows in May and June.—Eng. Bot. T. 759.

12. Short-spiked Foxtail Grass (*A. brachystachyus*, Bieberstein). A perennial, eighteen inches high, from Siberia in 1820: straw erect; spikes egg-oblong, hairy; spikelets longer than the awns; leaf-sheath inflated above.

13. Gerard's Foxtail Grass (*A. Gerardi*, Villars). A perennial found in France and Italy: spikes clustered, somewhat round; husks lance-shaped, tapering to a point, sword-shaped, velvety, unequal; awn scarcely longer than the chaff.—Vill. Delph. II. 66. Tab. 2, f. 6.

14. Bottle-shaped Foxtail Grass (*A. utriculatus*, Persoon). An annual from the Levant: straw ascending; clustered; spikes egg-oblong; husks with a dilated keel beyond the middle.

15. Sheathed Foxtail Grass (*A. vaginatus*, Pallas). A perennial found on Mount Caucasus: husks abruptly blunt, velvety; awn doubly shorter; root-leaves very narrow.

16. Northern Foxtail Grass (*A. borealis*, Trinius). Found in Asia and North America: panicle oblong-cylindrical; husks tooth-formed, pointed, joined at the base, on each side silky; chaff oblique, furrowed, awned; styles united beneath.

17. Cape Foxtail Grass (*A. Capensis*, Thunberg). A native of the Cape of Good Hope: spikes cylindrical; husks smooth, awnless.—Thunb. Flor. Cap. I. 397.

18. Tailed Foxtail Grass (*A. caudatus*, Thunberg). A native of Japan: panicle spiked, tail pointed; florets awned.

19. Shaggy-spiked Foxtail (*A. lasiostachyus*, Link). A native of Spain: panicle oblong-cylindrical; husks hairy on the back; chaff awned at the base.—Link, Hort. I. 71.

20. Broad-leaved Foxtail Grass (*A. latifolius*, Cavanilles). A native of the Island of Tobago: leaves lance-shaped, full; panicle whirled; husks fringed, awnless.—Cav. Descr. 37.

21. Long-spiked Foxtail Grass (*A. macrostachyus*, Poiret). A perennial of Barbary: straw somewhat inflexed; spikes thick, oblong; spikelets branched, velvety-fringed; root bulbous.—Encycl. VIII. 775.

22. Australian Foxtail Grass (*A. ovatus*, Forster). Found in Australia: panicles egg-oblong, close; outer chaff-valve awned before the tip.—Forster Flor. Austr. 8.

23. Silky Foxtail Grass (*A. sericeus*, Gaertner). Found in Germany: straw erect; above naked; spikes egg-oblong, cylindrical, very velvety, awned.—Gaertn. Fruct. I. 2. T. 1, f. 2.

24. Velvety Foxtail Grass (*A. villosus*, Poiret). Found in Spain: leaves velvety above; spikes slender; husks awned; chaff-valves mostly two; keel hairy; straw slender, somewhat inflexed.—Encycl. VIII. 777. [G. L.]

ALOYSIA, Ruiz and Pavon (altered from *Louisa*, in honour of *Maria Louisa*, mother of Ferdinand VII. of Spain). Louisa's Shrub. *Didynamia Angiospermia*, Linnæus; *Verbenaceæ*, Jussieu. Calyx deeply four-parted; corolla tubular, four-lobed; stigma notched at the top; stamens four perfect; seeds two.—R. and P. Flor. Peruv.

1. Lemon-scented Louisa's Shrub (*A. citriodora*, Ruiz and Pavon). An ornamental greenhouse shrub, about three feet high, from Peru and Chili in 1784: leaves line-like, lance-shaped, pointed, entire, remote, growing in threes; flower-scales (*bracteæ*) rather short; flowers, from May to September, pale purple, stalked, in opposite, solitary, axillary spikes; propagated by cuttings in loam. *Verbena triphylla*, Bot. Mag., Heritier; *Lippia citridora*, Kunth.—Bot. Mag. 367. [A. C.]

ALPESTRIS (from the Greek 'αλσυς, "the Alps"). Plants are so called that grow on the sides of mountains, and which occupy the intermediate regions between the plants of the plain and the Alpine plants.

ALPHITOMORPHA, Wallroth. A genus arranged by Fries under *Erysiphe*. [Q. R.]

ALPHONSIA, Humboldt. A genus arranged under *Elæis*. [A. C.]

ALPINE. Belonging to the Alps or any lofty mountains. Alpine plants are usually of low growth, with proportionally very large flowers, in which blue is the most prevalent colour. In rearing plants which grow naturally in a cold climate, exposed to much light, and to be beat upon by tempestuous winds, care must be taken to place them in the most open and sheltered place in the garden. The gardener, however, must not be surprised if, with all his care, he do not always succeed in getting Alpine plants to preserve their characters under circumstances so different from those of their native localities. The recent interesting observations of M. Gay, in his Scientific Researches on the Cordilleras of South America, are in this respect worthy of the attention of the practical cultivator. Speaking of his discovery of several rare and beautiful species of *Baccharis*, *Loasea*, *Alstrœmeria*, and "above all," he says, "these charming *Mutisia*, which exhibit a most singular phenomenon," he adds: "the tendrils with which these plants are usually furnished, becoming useless in these cold regions, unprovided with shrubs or bushes, change into real leaves, organs of such great utility to alpine plants. I have also remarked that the plants which are herbaceous in the plains, become here entirely ligneous; and that several trees, especially *Escallonia*, instead of assuming that forked appearance which characterises them, become stunted, creeping along the rocks, and thus offering less surface to the cold, with which the wind is charged in passing over the numerous and immense glaciers. But another observation which I have also made among these cold regions, is still more interesting; it is the form of imbricated leaves, which the greater portion of the vegetables assume—those genera even whose habitual form seems to be entirely contrary to this disposition. Thus, the leaves of the *Triptilion*, which are so lax and small in the lower regions, become here extremely hard and tough, closely imbricating the stalk, and even the flowers of these beautiful plants, the *Mutisia*, which is nearly devoid of leaves when at the side of the mountains, produce at their summit a considerable number. The violets here have not that elegant form which we observe in those lower down, but are found under a form altogether different. They represent a rosette, which may be compared to that of a *Sedum*, with this difference, that the leaves, instead of being almost vertical, are in these alpine violets entirely horizontal. Those leaves, which are extremely hard and tough, are round, scabrous, strongly imbricated, and exhibit at the foot-stalks flowers, which are sessile, and of a violet colour, somewhat approaching to red. Although very familiar with the genera *Triptilion*, *Escallonia*, *Mutisia*, *Viola*, the particular aspect of these alpine species caused me to mistake them entirely; and I did not discover to what genus they belonged, until I studied them after my return."—*Annales des Sciences Naturelles*. (See ALTITUDE.)

These observations are no less important in a physiological than in a practical point of view. [B. R.]

ALPINE BROOK. The common name of the *Saxifraga rivularis*. [A. C.]

ALPINIA, Linnæus (from P. Alpini, an Italian physician). Alpini's Plant. *Monandria Monogynia*, Linnæus; *Scitamineæ*, Jussieu. Calyx three-toothed; corolla of one petal; outer limb three-parted; inner limb with one lip; filament simple; anthers double, terminal; style the length of the filament received in a furrow of the anther; capsule berried, many-seeded.

1. Winged Alpini's Plant (*A. alata*, Dietrich). An ornamental evergreen bark-stove perennial, three feet high, from China in 1823: leaves spear-shaped, acute; leaf-stalks winged; flowers, in May, red; lip three-parted, nicked; anthers egg-oblong. *A. bracteata*, Roscoe, Linn. Trans. XI. Pl. X. T. 87.

2. Allughas of Ceylon (*A. Allughas*, Roscoe). An ornamental evergreen bark-stove perennial, two feet high, from the East Indies in 1796: leaves lance-shaped, smooth; flowers, from February till March, red; panicle somewhat contracted terminal, lip two-cleft; flower-stem wavy; propagated by division of the root in sandy loam.— Rosc. Linn. Tran. VIII., p. 346.

3. Antilles Alpini's Plant (*A. Antillarum*, Roscoe). An ornamental evergreen bark-stove perennial, four feet high, from the West Indies in 1826: flowers, in May and June, blush-red; propagated by division in sandy loam.—Sloan. Jam. 105.2.

4. Sweet-scented Alpini's Plant (*A. aromatica*, Jacquin). Leaves egg-oblong, lance-shaped, in a compound bunch, little bunches spreading: seeds many, reddish, accumulated in a saffron-coloured pulp.—Jacq. Fragm., p. 50, No. 176, Tab. 747.

5. Eared Alpini's Plant (*A. auriculata*, Roscoe). An ornamental evergreen bark-stove perennial, four feet high, from the Molucca Islands in 1814: leaves lance-shaped, with the mid-rib on both sides rusty and hairy; flowers, in April and May, reddish-yellow, in drooping clusters; lip rather round, notched, with an ear-like process at the base; propagated by division in sandy loam.—Rosc. Scit.

6. Flower-scaled Alpini's Plant (*A. bracteata*, Roxburgh). An ornamental evergreen bark-stove perennial, three feet high, from the East Indies in 1824: stem erect; leaves lance-shaped, tapering on each side, velvety beneath; flowers, from May to June, white, in a simple terminal bunch; foot-stalks one-flowered; flower-scales (*bracteæ*) green; lip somewhat three-lobed; segments lateral, curved into a tube; propagated by division in sandy loam.

7. Short-lipped Alpini's Plant (*A. brevilabris*, Dietrich). Leaves line-like, lance-shaped, on each side tapering, smooth, with a terminal bunch; foot-stalks fascicled; flowers small, red; corolla with a short four-lobed lip; lobes line-like; capsule round.—Dietrich, Sp. Plant. I.

8. Spur-flowered Alpini's Plant (*A. calcarata*, Roscoe). An ornamental evergreen bark-stove perennial, three feet high, from the East Indies in 1800: stems numerous, erect; leaves one foot long, line-like, lance-shaped, smooth; flowers, in September, white; bunch terminal, a little inclining; lip egg-oblong, simple, nicked at the tip, two-parted; propagated by division of the root in sandy loam.—Bot. Rep. 421.

9. Cardamom Alpini's Plant (*A. Cardamomum*, Roxburgh). An evergreen bark-stove perennial, nine feet high, from the East Indies in 1815: root tuberose, with many fleshy fibres; stem erect, smooth; leaves lance-shaped, pointed, downy above, silky beneath; panicle at the base of the stem compound, wavy, procumbent; flowers, in August, whitish purple: lip three-lobed at the base, spurred; flowers short foot-stalked, solitary.

10. Drooping Alpini's Plant (*A. cernua*, Bot. Mag.) An

ornamental evergreen bark-stove perennial, six feet high, from the East Indies in 1804: leaves lance-shaped, toothed on the margin, rough, pointed, longish, line-like; bunch compound, drooping; flowers, from April till June, pink; flower-scales whitish, lip on the tip notched; propagated by division of the root in sandy loam.

11. Tuft-spiked Alpini's Plant (*A. comosa*, Jacquin). An ornamental evergreen bark-stove perennial, one foot high, from the Caraccas in 1752: leaves egg-oblong, downy; flowers, from April till June, white; spike terminal, comose; flower-scales coloured, longer than the flowers; propagated by division of the root in sandy loam.—Jacq. Ic. V. 3.

12. Two-cleft Alpini's Plant (*A. diffissa*, Roscoe). An ornamental evergreen bark-stove perennial, six feet high, from the East Indies in 1818: stem erect; leaves lance-shaped; flowers, from April till June, pale blue and yellow; spike terminal, reclined; lip fiddle-shaped, entire, blunt; filament deeply two-parted; bunch many-flowered.

For *A. exaltata*, Roemer, see Reanalmia.

13. Galanga Alpini's Plant (*A. Galanga*, Swartz). An ornamental evergreen bark-stove perennial, six feet high, from the East Indies: stems somewhat erect, smooth; leaves somewhat sitting, broad, lance-shaped; flowers, from October till February, whitish-yellow; panicle terminal, lip unguiculate, oblong, two-parted at the tip; capsules inversely egg-oblong, smooth; root tuberous; propagated by division of the root in sandy loam.—Rumph. Amb. V. 63.

14. Tongue-shaped Alpini's Plant (*A. linguiformis*, Roxburgh). An ornamental evergreen bark-stove perennial, six feet high, from the East Indies in 1820: leaves sitting, one to two feet long, lance-shaped, smooth; flowers, in July and August, red; spikes radical, line-like, rather spreading, tongue-shaped, two-parted, lateral, bent inwards, at the base broad; propagated by division in sandy loam.

15. Magnificent Alpini's Plant (*A. magnifica*, Roscoe). A perennial, found in the islands of St. Mauritius: stem erect; leaves line-like, lance-shaped; flowers, fifty to one hundred, in aggregated bunches, in a common receptacle; lip line-like, at the tip, roundish; filaments and styles downy.

16. Malacca Alpini's Plant (*A. Malaccensis*, Roscoe). An ornamental evergreen bark-stove perennial, five to ten feet high, from the East Indies in 1799: stems numerous, central, erect; leaves in two rows, lance-shaped, velvety beneath, two to three feet long, six to nine inches broad; flowers, from April till May, white; bunches terminal, simple; lip very broad, obscurely three-lobed; lobes lateral, in a tube bent inwards; capsules oblique, velvety; propagated by division of the root in sandy loam.—Bot. Reg. 328.

17. Medium Alpini's Plant (*A. media*, Sprengel). An ornamental evergreen bark-stove perennial, six feet high, from the East Indies in 1815: leaves two to three feet long, two to four inches broad, lance-shaped, velvety beneath; flowers, in July and August, red, fragrant; spikes radical, lax lip heart-shaped; capsules foot-stalked, with nine conical wings; propagated by division in sandy loam.—Linn. Tr. 10, 4, 5.

18. Spurless Alpini's Plant (*A. mutica*, Roxburgh). An ornamental evergreen bark-stove perennial, five feet high, from the East Indies in 1811: leaves narrow, shining flowers, in August, white; bunches compound; lip indistinctly three-lobed, no spur; capsule berried; propagated by division of the root in sandy loam.—Rosc. Scit. Ic.

19. Nodding Alpini's Plant (*A. nutans*, Roscoe). An ornamental evergreen bark-stove perennial, ten to thirteen feet high, from the East Indies in 1722: root tuberose; stem, erect; leaves lance-shaped, smooth, fringed on the margin; flowers, from April till June, pink; bunch nodding; lowest foot-stalks two to three-flowered; lip broad, egg-oblong, three-lobed, nicked; middle lobe somewhat two-parted at the top; capsules spherical; propagated by division of the root in sandy loam. *Globba nutans*, Linnæus.—Ex. Bot. II. 106.

20. Occidental Alpini's Plant (*A. occidentalis*, Swartz). An ornamental evergreen bark-stove perennial, six feet high, from Jamaica in 1793: leaves lance-shaped, very smooth; flowers, in July, white; lip at the tip notched; propagated by division of the root in sandy loam.

21. St. Vincent's Alpini's Plant (*A. Paco Secona*, Jacquin). Found in the Island of St. Vincent: leaves egg-oblong; flowers rather purplish; bunch simple; lip yellow; fruit blood-red, with the succulent and magnitude of a plum.—Jacq. Frag. p. 54, N. 177, Tab. 76.

22. Pencilled Alpini's Plant (*A. penicellata*, Roscoe). An ornamental evergreen greenhouse perennial, three feet high, from China: stem erect, at the base reddish; leaves lance-shaped; flowers, in May and June, pink; bunch terminal, nodding; lip somewhat roundish, tubular, rolled inwards, on the margin wavy; filament thick egg-oblong; calyx white, at the base green, at the tip red; propagated by division in sandy loam.—Rosc. Scit. Ic.

23. Scarlet Alpini's Plant (*A. punicea*, Roxburgh). An ornamental evergreen bark-stove perennial, six feet high, from the East Indies in 1820: stems numerous, erect or ascending, smooth, turned at the base; leaves lance-shaped, smooth; flowers, in March, scarlet; spikes radieal, compact, tiled; propagated by division in sandy loam.

24. Branched Alpini's Plant (*A. racemosa*, Roscoe). An ornamental, evergreen bark-stove perennial, three to five feet high, from the West Indies in 1752: leaves lance-shaped; flowers, in July and September, white; bunch terminal; flowers somewhat in pairs; lip three-parted, middle segment notched; calyx red; propagated by division of the root in sandy loam.—Pl. Ic. II. 20.

25. Spiked Alpini's Plant (*A. spicata*, Roxburgh). An ornamental evergreen bark-stove perennial, two feet high, from Sumatra in 1822: leaves sitting, broad, lance-shaped; spike terminal, oblong, straightly tiled; flower-scales narrow, lance-shaped, pointed; propagated by division of the root in rich mould.

26. Streaked Alpini's Plant (*A. striata*, Link). An ornamental evergreen bark-stove perennial, four feet high, from the East Indies in 1818; propagated by division in sandy loam.

27. Tubular Alpini's Plant (*A. tubulata*, Lindley). An ornamental evergreen bark-stove perennial, two feet high, from Demarara in 1820: flowers, in July and August, red. [G. L.]

ALSEIS, Scholt (from the Greek '*αλσωδης*, "bushy"). Bush Tree. *Pentandria Monogynia*, Linnæus; *Rubiaceæ*, Jussieu. Calyx with a superior five-parted limb; corolla cup-shaped, limbed and lobed, mouth bearded; five stamens, proceeding from the base of the corolla, free; stigmas two-parted; seed-organ two-celled.

1. Many-flowered Bush Tree (*A. floribunda*, Scholt). A moderate sized tree, from Brazil, with oblong, taper-pointed leaves, and with terminal spikes of small yellowish-white flowers. [B. E.]

ALSINACEOUS (from the Latin *Alsine*, "chickweed"). Applied by Link to the corolla when it has short distant claws. [A. C.]

ALSINE, Linnæus (probably from '*αλσος*, "a shady place," in allusion to place of growth). Chickweed. *Pentandria Trigynia*, Linnæus; *Caryophylleæ*, Jussieu. Flowers inferior; calyx five-leaved; five petals, equal; capsule superior, one-celled, three-valved, many-seeded; receptacle free. This genus has been arranged by De Candolle under *Arenaria*, *Stellaria*, &c. [A. C.]

ALSINEÆ, De Candolle. The second group of De Candolle's *Caryophylleæ*: consisting of plants corresponding with *Alsine*, in having the calyx cleft to the base: *Ortega*, *Bufonia*, *Sagina*, *Hymenella*, *Mochringia*, *Bergia*, *Molluga*, *Physa*, *Holosteum*, *Spergula*, *Labria*, *Drymaria*, *Stellaria*, *Arenaria*, *Cerastium*, &c. [A. C.]

ALSINELLA, Miller. A genus now arranged under SAGINA.

ALSINOIDES, Miller. A genus now arranged under MONTIA and BUFONIA.

ALSODEA, Du Petit Thouars (from the Greek, *αλσωδης*, "leafy," the plants being thickly beset with leaves). Leaf Plant. *Pentandria Monogynia*, Linnæus; *Violarieæ*, De Candolle. Calyx with five acute, tiled divisions, three outer, two inner; petals alternate, and longer than the calyx leaves; stamens alternating with the petals; seed-organ simple; style club-shaped; capsule bluntly three-sided, and covered with the permanent calyx and corolla, with one or two seeds in each valve; seed-lobes round.—De Cand. Prod. I. 313.

1. Narrow-leaved Leaf Plant (*A. angustifolia*, Du Petit Thouars). A stove shrub, six feet high, a native of Madagascar: leaves oblong-lance-shaped, toothed; flowers in spiked clusters; propagated by cuttings in sand and loam.—Pet. Th. Tab. 17, fig. 1. D. C. Sp. 3.

2. Tree Leaf Plant (*A. arborea*, Du Petit Thouars). A tree of Madagascar: leaves on long stalks, bent downwards; flowers in panicles; propagated by cuttings in sand and loam.—D. C. Sp. 2.

3. Broad-leaved Leaf Plant (*A. latifolia*, Du Petit Thouars). An ornamental, evergreen, stove shrub, six feet high, from Madagascar in 1824: leaves egg-oblong, bluntly pointed; flowers, white, in thick clusters, smooth; propagated by cuttings in sand and loam.—Pet. Th. Tab. 18, fig. 2. D. C. Sp. 4.

4. Few-flowered Leaf Plant (*A. pauciflora*, Du Petit Thouars). An ornamental, evergreen, frame shrub, four feet high, from Madagascar in 1824: leaves wedge-shaped, on short stalks; flowers few, white; partial flower-stalks bent backwards; propagated by cuttings in sand and loam.—Pet. Thou. Hist. Veg. Afr. II. 57, fig. 17. D. C. Sp. 1.

5. Downy Leaf Plant (*A. pubescens*, Du Petit Thouars). A stove shrub, six feet high, a native of Madagascar: leaves egg-oblong, wedge-shaped at the base, toothed; flowers in clusters, downy; propagated by cuttings in sand and loam.—Pet. Th. Tab. 18, fig. 3. D. C. Sp. 5. [A. C.]

ALSODINEÆ, R. Brown. (Agreeing with *Alsodea* in the more important points.) The second tribe of De Candolle's *Violarieæ*. Petals equal; stamens generally united at their base, or attached to the inner side of a secondary corolla (*urceolus*), which is between the petals and the stamens. The genera of which it consists are *Alsodea*, *Ceranthera*, *Gonohoria*, *Rinorea*, *Pentaloba*, *Spatularia*, *Hymenanthera*, and *Piperea*.—De Cand. Prod. I. 312. [A. C.]

ALSOPHILA, R. Brown (from the Greek, *αλσος*, "a grove," and *φιλεω*, "I love"). Love-grove Fern. *Cryptogamia Filices*, Linnæus; *Polypodiaceæ*, Jussieu. Spore-cases united in rounded groups upon a tubercle projecting from the junction (*axilla*) of two secondary leaf-ribs; spore-cases in a globular envelope (*involucrum*), bursting irregularly at the top, distinguishing this genus from *Cyathea*, in which it opens crosswise by a sort of lid (*operculum*).

1. Rough Lovegrove Fern (*A. aspera*, Sprengel). An ornamental, evergreen, bark-stove perennial, from the West Indies in 1824: propagated by seeds or division in peaty loam.

2. Australian Lovegrove Fern (*A. Australis*, R. Brown). An ornamental, evergreen, greenhouse perennial, one foot high, from New Holland in 1824: propagated by seeds or division in peaty loam. [B. E.]

ALSOMITRA. A section of the genus *Zanonia*.

ALSTONIA, R. Brown (named after Professor Alston of Edinburgh). Alston's Shrub. *Pentandria Monogynia*, Linnæus; *Apocyneæ*, Jussieu. Corolla rather salver-shaped, the throat naked; stamens shorter than the corolla; anthers free; follicles rounded; seed very hairy.—Spreng. Syst. Veg. I. 636.

1. Rib-leaved Alston's Shrub (*A. costata*, R. Brown). A native of the Friendly Islands: leaves opposite, oblong, taper pointed, ribbed; flowers in scattered bouquets; limb of the corolla not bearded. *Echituscostata*, Foster.—Spreng. Sp. 4.

2. School Alston's Shrub (*A. scholaris*, R. Brown). An ornamental, evergreen, stove shrub, eight feet high, from the Molucca Islands in 1824: leaves rather whirled, oblong, egg-oblong, blunt, ribbed; flowers, in March, April, and May, white, in stalked bouquets; limb of the corolla bearded; propagated by cuttings in sandy peat. *Alstonia oleandræfolia*, Loddiges; *Nerium tinctorium* of the gardens; *Echitus scholaris*, Linnæus.—Spreng. Sp. 1.

3. Graceful Alston's Shrub (*A. spectabilis*, R. Brown). A native of the island of Timor: leaves in fours, oblong, taper-pointed, ribbed; flowers stalked, in bouquets; limb of the corolla bearded.—Spreng. Sp. 2.

4. Poisonous Alston's Shrub (*A. venenata*, R. Brown). An ornamental, evergreen, stove shrub, six feet high, from the East Indies in 1825: leaves in fours, oblong lance-shaped, taper-pointed, slender at the base; flowers in May and June, white, in paired bouquets; limb of the corolla not bearded; propagated by cuttings in peaty loam.—Spreng. Sp. 3. [A. C.]

ALSTRŒMERIA, Linnæus (named in honour of Baron Alstrœmer). Alstrœmer's Flower. *Hexandria Monogynia*, Linnæus; *Amaryllideæ*, Jussieu. Corolla of six petals, bell-shaped, or rather two-lipped, the two lower calyx-leaves half-tubular at the base; stamens inserted into the base of the corolla; stigmas three, line-like; capsules three to six-cornered; seeds globular.—Spreng. Syst. Veg. II. 80.

I.

THE STEMS ERECT.

1. Two-coloured Alstrœmer's Flower (*A. bicolor*, Loddiges). An ornamental greenhouse plant, raised by Loddiges in 1826: two feet high, vigorous; flowers in May and June; propagated by division of the roots in loamy peat, with a large portion of very old rotten dung.

2. Brazilian Alstrœmer's Flower (*A. Brasiliensis*, Sprengel). A native of Brazil: leaves lance-shaped, pointed, ribbed, very smooth; flowers in umbels; stalks one-flowered; petals lance-shaped, pointed, entire, streaked.—Spreng. Sp. 16.

3. Clove Alstrœmer's Flower (*A. caryophyllea*, Jacquin). Native country unknown: leaves spatula-lance-shaped, three-ribbed; the flower-stem rather leafy; fence and flower-stalks equal in length; petals very spreading.—Spreng. Sp. 4.

4. Two-row-leaved Alstrœmer's Flower (*A. distichophylla*, Ruiz and Pavon). A native of Peru: leaves in two opposite rows (*distichus*), oblong-lance-shaped, stalked; flowers in umbels; flower-stalks one-flowered; the inner petals flat, and broader than the outer ones.—Spreng. Sp. 12.

5. St. Martin's Alstrœmer's Flower (*A. Flos Martini*, Ker). An ornamental, greenhouse, tuberous-rooted perennial, about one foot and a half high, from Chile in 1822: leaves line-like; flowers, in June, pale yellow; flower-stalks three-flowered ? wavy; petals inverse-egg-oblong, terminating in a little point, saw-toothed; propagated by seed in loam, sand, and peat. *A. pulchra*, Sims.—Bot. Reg. Sp. 7.

1. A. Flos Martini, 5. 2. A. Ovata, 38. 3. A. Salsilla, 41. 4. A. Ligtu, 8. 5. A. Pelegrina, 13.

6. Hoary-greyish Alstrœmer's Flower (*A. glaucescens*, Humboldt). A native of Quito: stem naked at the top; leaves lance-shaped, rigid, streaked, and of a hoary-greyish colour beneath; flowers in umbels, stalked; petals blunt, streaked.—Spreng. Sp. 14.

7. Blood-flowered Alstrœmer's Flower (*A. hæmantha*, Ruiz and Pavon). A native of Chili, with line-like, lance-shaped, fringed leaves; flowers in umbels; the flower-stalks two-flowered, and the inner petals toothed at the tip.

8. Ligtu Alstrœmer's Flower (*A. Ligtu*, Linnæus). An ornamental, greenhouse, tuberous-rooted perennial, one foot high, from Peru in 1776: leaves spatula-shaped, oblong, shining; flowers, in February and March, scarlet, in umbels; flower-stalks longer than the fence; upper petals spotted, the lower spatula-shaped; propagated by division of the root in loam, sand, and peat.—Bot. Mag. 125. Spreng. Sp. 3.

9. Line-flowered Alstrœmer's Flower (*A. linealiflora*, Ruiz and Pavon). A native of Peru, with lance-shaped, shining, ribbed leaves; flowers in umbels; the flower-stalks two-flowered, and the petals wedge-shaped, same-toothed, and marked with lines.—Spreng. Sp. 11.

10. Flax-leaved Alstrœmer's Flower (*A. linifolia*, Humboldt). A native of Peru: stem downy; leaves lance-shaped, blunt, rolled back, smooth; flowers externally rather covered with long loose hairs, in umbels, stalked; petals rather pointed, nerved.—Spreng. Sp. 15.

11. Neil's Alstrœmer's Flower (*A. Neillii*, Gill). An elegant, tuberous-rooted, greenhouse perennial, two feet high, from Mendoza in 1827: flowers, pale, rosy, in June; propagated by offsets in loamy peat.—Bot. Mag. 3150.

12. Pale Alstrœmer's Flower (*A. pallida*, Graham). An elegant, tuberous-rooted, greenhouse perennial, two feet high, supposed to be from Chili in 1827: flowers, in September and October, pink or red; propagated by offsets in loamy peat.

13. Spotted-flowered Alstrœmer's Flower (*A. pelegrina*, Willdenow). An ornamental, greenhouse, tuberous-rooted perennial, about one foot high, from Peru in 1753: leaves line-like-lance-shaped, shining, oblique; flowers, from June to September, striped; corolla spreading; outer petals wedge-shaped, three-toothed, the inner notched at the end; propagated by division of the roots in rich mould.—Bot. Mag. 139. Spreng. Sp. 1.

14. Parrot Alstrœmer's Flower (*A. psittacina*, Lehmann). An elegant, greenhouse, tuberous-rooted perennial, six feet high, from Mexico in 1829: stem upright, spotted, very small; leaves oblong, lance-shaped, pointed, ribbed; flowers, in September and October, in many-flowered umbels; flower-stalks one-flowered, angled; propagated by offsets in loamy peat.—Sweet, Fl. Gard. 15.

15. Pretty, or Hooker's Alstrœmer's Flower (*A. pulchella*, Sims). An ornamental frame perennial, two feet high, from Chili in 1822: stem weak; leaves spatula-shaped, fringed; flowers, in June, scarlet, on two-flowered stalks; propagated by seed in loam, sand, and peat. *A. Hookerii*.—Bot. Cab. 1272.

Var. a. Hairy-leaved (*A. pilosa*, Lindley). A splendid tuberous-rooted, moist or bark-stove perennial, one foot high, from Chili: leaves beset with hairs; flowers, in August, scarlet; propagated by seed in loam, sand, and peat.—Bot. Reg. 1410.

16. Revolute Alstrœmer's Flower (*A. revoluta*, Ruiz and Pavon). A native of Chili, with lance-shaped leaves; the umbels two-flowered; the petals rolled back (*revolute*), and the inner ones the least.—Spreng. Sp. 8.

17. Secund-leaved Alstrœmer's Flower (*A. secundifolia*, Ruiz and Pavon). A native of Peru: stem curved downwards; leaves arranged on one side only (*secunda*), lance-shaped, taper-pointed, whitish beneath, from a kind of dense close hair; umbels five-flowered; the flowers externally woolly.—Spreng. Sp. 13.

18. Three-coloured Alstrœmer's Flower (*A. tricolor*, Loddiges). A native of Chili, two feet high, lately introduced: flowers in May and June; the seeds sometimes ripen here; grown in loam and peat, with some rotten dung from an old hotbed; the root will seldom permit separation.

19. Many-coloured Alstrœmer's Flower (*A. versicolor*, Ruiz and Pavon). A native of Chili, with lance-shaped, line-like leaves; the flower-stalks disposed to be in threes; the side petals narrow, and the lowest egg-oblong.—Spreng. Sp. 9.

II.

STEM CLIMBING.

20. Acute-leaved Alstrœmer's Flower (*A. acutifolia*, Link). An ornamental, twining, frame perennial, six feet high, from Mexico in 1829: flowers, from August to October; propagated by offsets in loamy peat.—Sweet's Fl. Gard. II. 77.

21. Toothletted Alstrœmer's Flower (*A. denticulata*, Ruiz and Pavon). A native of Peru: stem rounded, smooth; leaves oblong, taper-pointed, toothletted, downy beneath; flowers in umbelled bunches; the flower-stalks with flower-scales (*bracteæ*); petals sharp-pointed.—Spreng. Sp. 19.

22. Beautiful Astrœmer's Flower (*A. formosa*, Ruiz and Pavon). A native of Peru, with lance-shaped, lengthened, pointed leaves, and its flowers in many-flowered umbels, in the form of half a sphere.—Spreng. Sp. 22.

23. Long-fruited Alstrœmer's Flower (*A. macrocarpa*, Ruiz and Pavon). A native of Peru: stem rounded, smooth; leaves oblong-lance-shaped, pointed, downy beneath; umbels many-flowered; flower-stalks two-flowered; capsule having the figure of a top.—Spreng. Sp. 21.

24. Purple Alstrœmer's Flower (*A. purpurea*, Ruiz and Pavon). A native of Peru: stem downy; leaves lance-shaped, pointed, streaked, covered beneath with long loose hairs; flowers in a sort of bunch, the stalks woolly.—Spreng. Sp. 21.

25. Bristle-leaved Alstrœmer's Flower (*A. setacea*, Ruiz and Pavon). A native of Peru: stem rounded, smooth; leaves lance-shaped, streaked, and downy beneath; umbels many-flowered; flower-stalks downy, with flower-scales (*bracteæ*); petals approaching each other, sharp-pointed.—Spreng. Sp. 18.

26. Tomentose Alstrœmer's Flower (*A. tomentosa*, Ruiz and Pavon). A native of Peru: stem angular, smooth; leaves lance-shaped, rolled back, beneath streaked and cottony; flowers in umbels; stalks two-flowered; inner petals spatula-shaped.—Spreng. Sp. 17.

III.

STEMS WHICH MAY BE EASILY TURNED OR TRAILED.

27. Two-edged Alstrœmer's Flower (*A. anceps*, Ruiz and Pavon). A perennial of Peru: stem two-edged; leaves lance-shaped, pointed, stalked; umbels many-flowered; petals conforming.—Spreng. Sp. 27.

28. Flower-scaled Alstrœmer's Flower (*A. bracteata*, Ruiz and Pavon). A perennial, native of Peru: stem and leaves above rounded; line-like-lance-shaped, downy beneath; flowers in umbels; flower-stalks two-flowered; flower-scales (*bracteæ*) lengthened; petals conforming.—Spreng. Sp. 30.

29. Crocus-leaved Alstrœmer's Flower (*A. crocea*, Ruiz and Pavon). A perennial, native of Peru: stem rounded; leaves line-like-lance-shaped, taper-pointed, without stalks, downy beneath; umbels many-flowered; petals conforming.—Spreng. Sp. 29.

30. Eatable Alstrœmer's Flower (*A. edulis*, Jussieu). An ornamental bark or moist stove trailing perennial, four feet high, from Trinidad in 1820: flowers, in July and August, red; propagated by division of the roots in loam, sand, and peat.—Fl. Ant. 14.

31. Fringed Alstrœmer's Flower (*A. fimbriata*, Ruiz and Pavon). A perennial, native of Peru: stem very smooth; leaves narrow, lance-shaped, stalked, downy beneath; umbels many-flowered; inner petals fringed.—Spreng. Sp. 31.

32. Many-flowered Alstrœmer's Flower (*A. floribunda*). A perennial plant, native of Quito and New Granada: leaves egg-lance-shaped, stiffish, streaked, smooth on both sides; umbels many-flowered; flower-stalks downy, and the outer petal the shortest. *A. Caldesii*, Kunth.—Spreng. Sp. 37.

33. Large-leaved Alstrœmer's Flower (*A. grandifolia*, Kunth). A perennial, native of Peru: stem smooth; leaves egg-shaped, taper-pointed, downy beneath; flowers in umbels; flower-stalks one-flowered, rather covered with long loose hairs; petals conforming.—Spreng. Sp. 34.

34. Rather-hairy Alstrœmer's Flower (*A. hirtella*, Kunth). An ornamental perennial, four feet high, from Mexico in 1824: stem smooth; leaves oblong, taper-pointed, streaked, stalked, downy beneath; flowers, in July, in many-flowered umbels; outer petals shortest; propagated by seed in peaty loam.—Sweet's Brit. Flow. Gard. 228; Spreng. Sp. 36.

35. Shaggy Alstrœmer's Flower (*A. hirsuta*, Kunth). A perennial, native of New Granada: leaves oblong, taper-pointed, stiffish, rough with soft hairs beneath; umbels many-flowered; outer petals the shortest.—Spreng. Sp. 33.

36. Broad-leaved Alstrœmer's Flower (*A. latifolia*, Ruiz and Pavon). A perennial, native of Peru: leaves egg-oblong, downy beneath; umbels many-flowered; flower-stalks about three-flowered; outer petals streaked.—Spreng. Sp. 32.

37. Many-flowered Alstrœmer's Flower (*A. multiflora*, Linnæus). A perennial, native of New Granada: leaves lance-shaped, taper-pointed, stalked; flowers in umbels; flower-stalks shorter than the fence (*involucrum*), one-flowered; petals alternate, blunt, as if cut off. *Bomarea multiflora*, Mirbel.—Spreng. Sp. 25.

38. Egg-shaped Alstrœmer's Flower (*A. ovata*, Cavanilles). An ornamental perennial, four feet high, from Peru in 1824: leaves oblong, taper-pointed, stalked, clothed beneath with long loose hair; flowers, in June and July, in umbels; flower-stalk two-flowered, furnished with flower-scales (*bracteæ*) lax; petals approaching each other; propagated by division of the root in sand, loam, and peat. *Bomarea ovata*, Mirbel.—Spreng. Sp. 26.

39. Few-flowered Alstrœmer's Flower (*A. pauciflora*, Kunth). An ornamental stove perennial, three feet high, from New Granada in 1823: leaves egg-lance-shaped, stiffish, ribbed; flowers, in September, orange green; flower-stalks two-flowered, and furnished with flower-scales: the outer petals the longest; propagated by division of the root in loam, sand, and peat.—Spreng. Sp. 35.

40. Roseate Alstrœmer's Flower (*A. rosea*, Hooker). An ornamental, stove, tuberous-rooted perennial, one foot high, from Peru in 1824: stem rounded; leaves egg-oblong-lance-shaped, pointed, without stalks, downy beneath; flowers, in June and July, rose-coloured; umbels many-flowered; inner petals spotted or streaked; fence large; propagated by division of the root in loam, sand, and peat. *A. Simsii*, Sweet.—Hooker's Exotic Flora, 181. Spreng. Sp. 28.

41. Salsilla Alstrœmer's Flower (*A. Salsilla*, Linnæus). A greenhouse perennial, six feet high, from Peru in 1806: leaves lance-shaped, stalked, taper-pointed; flowers, in June and July, greenish crimson, in umbels; flower-stalks two-flowered, lengthened, furnished with flower-scales; petals inverse-egg-shaped; propagated by division of the root in loam, sand, and peat. In Peru and the West Indies it is cultivated for the root, which is very good for food.—Bot. Reg. 731. Spreng. Sp. 24.

42. Bent-leaved Alstrœmer's Flower (*A. torta*, Kunth). A perennial, native of Peru: leaves line-like-lance-shaped, bent back, without stalks; umbels many-flowered; outer petals longest.—Spreng. Sp. 38. [A. C.]

ALTAGANA. A common name for the *Caragana Altagana*. [A. C.]

ALTENSTEINA, Humboldt (named in honour of M. Altenstein). Altenstein's Orchis. *Gynandria Monogynia*, Linnæus; *Orchideæ*, Jussieu. Calyx-leaves bent back; lower lip erect; column rather short; anthers fixed behind; the filaments short, free.—Spreng. Syst. Veg. III. 700.

1. Fringed Altenstein's Orchis (*A. fimbriata*, Humboldt). A perennial, native of Quito: lower lip oval, fringed; column small, toothed at the tip.—Spreng. Sp 1.

2. Chaffy Altenstein's Orchis (*A. paleacea*, Kunth). A perennial, native of Quito: lower lip hooded, taper-pointed, fringed; column blunt. *Ophrys paleacea*, Kunth, Nov. Gen.—Spreng. Sp. 2.

3. Hairy Altenstein's Orchis (*A. pilifera*, Kunth). A perennial, native of Quito: lower lip oblong, taper-pointed, flat, entire; column bearing hairs at the tip.—Spreng. Sp. 3.

[A. C.]

ALTERATIONS OF PLANTS. In vegetable physiology, it appears to be a somewhat general law, that from every individual part of a plant, every other part, under certain circumstances, may be evolved. With respect to animal bodies of a perfect structure, this does not hold, because the internal structure of the individual organs is much more compound and diversified; and hence, in the higher animals it is only in the sickly state that such changes take place as muscle into cellular substance and fat, and of vascular membrane into bone, as the valves of the heart. In plants, on the other hand, this alteration is produced the more readily, the nearer the organs stand to each other in the process of formation. Roots, for example, may be altered into stem and branches; leaves into leaf-stalks, and leaf-stalks into leaves; calyces into corollæ, and stamens into petals; while, in some cases, the fruit may again push out leaves, and new branches may spring up from the receptacle.

When one part is formed from another, the parts first become compact and simple before they take an extended or a compound shape. Thus, the radical leaves are naturally more simple than the stem leaves, though the latter become in most cases more simple as they approach the blossom. If the process of compacting be by any means obstructed, the extension will be changed accordingly—a fruitful source of alterations. It is thus that parts naturally leafy, such as certain calyces, become dry and membranous; and, on the other hand, leafy parts become fleshy. The leaves, for example, of the bird's foot clover (*Lotus corniculatus*) and way-bread (*Plantago major*), when they grow in soils imbued with salt near the sea, become more than usually fleshy, like those of salt-wort (*Salicornia*) and kelp-wort (*Salsola*), which grow naturally there. It has also been observed that certain seed-vessels, apparently of such a structure as ought to become dry and opening, are nevertheless fleshy or indehiscent, as in the berry-campion (*Cucubalus baccifer*) and tutsan (*Androsæmum officinale*). The contrary is more rare. Some fleshy seed-vessels become dry, such as the monstrous vine, lately described by M. Von Schlechtendal, bearing capsules instead of grapes (*Linnæa*, 1830, p. 493). Mr. T. A. Knight, by artificial crossing, succeeded in producing fleshy almonds, and fibrous peaches; but we are still ignorant of the mode in which these alterations are effected.

The alterations of thorns present facts which are no less obvious than inexplicable. That the branches of certain trees growing in poor soil become changed into thorns can scarcely admit of doubt, insomuch as thorns are seen to grow in the place where there would have been branches, had the soil been good. It is conceivable, that if a great number of buds, situated at the inner base (*axilla*) of the leaves of a tree or of a shrub planted in a barren place, were to follow their natural growth, there would not be a sufficiency of sap to nourish them; and consequently those buds most advantageously situated near the summit or in the more herbaceous parts of the stem would alone be evolved into perfect branches; while the former would cease to increase, and would remain short. But why should they at the same time be harder? Whence comes the nutriment which hardens their woody part; since in other cases this woody part appears to be hardened by the pulp that has been elaborated in the leaves? These questions cannot, in the present state of our knowledge, be satisfactorily answered; though it is worthy of remark that thorny plants are very branchy—a circumstance which may possibly be connected with the causes producing thorns.

The causes by which parts of plants naturally cylindrical, such as branches, tend to become flat, exemplified in stems accidentally or usually bundled (*fasciata*) are of the number of those which puzzle us to explain at least in the generality of the phenomena. It is obvious, in most instances, that this alteration is owing to the longitudinal junction or grafting of many small branches, partially arranged on the same plane. We have now before us a bastard indigo (*Amorpha*), and an elder (*Sambucus*), both of which are evidently bundled together by the junction of branches growing in the same plane. But why, it may be asked, do so great a number of branches spring from a given point? Why are they otherwise disposed than usual; and how is this alteration of a kind to be continued, by grafting, budding, or layering? All these questions are still unresolved; while the first notion of such an explanation does not seem applicable to all bundled stems.

"Among these alterations in plants one of the most remarkable is that by which the parts primarily leafy become more or less floral, or the contrary; that is, some part usually floral has (*bewirkt*) a small callosity, more or less in the form of a genuine anther, while the petal itself apportionally approaches to the simple form of a filament. In some double poppies, anthers perfectly evolved, rest upon petals very little modified from a highly double corolla: in other species, the callosities similar to anthers serve more or less to contract the petals." (*Goethe, Versuch uber die Met. der Pflanzen*).

One of the most striking examples of such alterations is in roses during a moist spring. In certain varieties the axis of the flower is lengthened out, the seed-organ becomes abortive, and all the parts which, had the axis remained short, would have gone to form the calyx, the petals, the stamens, and the pistils, are altered into flat members, placed along the lengthened axis, presenting every degree of form, size, and colour intermediate between that of a petal and that of a leaf. We find, in particular, some which are one half green and one half rose-red, as if a portion had remained leaf while the rest was altered into petal. Similar alterations are often observed in tulips, in the rocket, and in a number of other plants cultivated in gardens. [B. E.]

ALTERATIVE MANAGEMENT. In gardening and farming, a course of manuring and cropping calculated to change the qualities of the soil. When a soil is stiff, for example, good alterative management, such as a

copious dressing of long dung and a portion of coal ashes (taking care not to overdo the latter) will tend to render it more friable and open. Next to manuring, the most important processes in alterative management are the judicious rotation of crops, fallowing, paring and burning, irrigation, and draining, the effects of which will be treated under these several articles. [B. H.]

ALTERATIVE MEDICINES. In veterinary practice, medicines are termed alteratives which tend to change the habit of body in an animal. They are described as those medicines which produce a change in the state of the system so gradually as to be somewhat imperceptible in its progress. What is meant, therefore, when the practitioner speaks of an alterative, is not any particular kind of medicine, any further than it is administered in such a way, or in such a dose, that its operation will not be immediately perceived. Still the term is sufficiently unmeaning; for it is evident that every drug in the Materia Medica, and, indeed, every change of diet, or stable management, may be so applied as to produce alterations which by an ordinary observer will not be noticed while they are going on. For example, small doses of digitalis will produce an effect which no one but the person watching for it would perceive; and in this way what is an alterative in one man's eyes is not so in another's. Under certain circumstances, too, the same medicine might be made to produce such an effect that every one would perceive it; and thus the same drug is an alterative and at the same time is not an alterative. The term, indeed, may be very conveniently laid aside. [C. S.]

ALTERNANTHERA, R. Brown (from *Alternus*, "alternate," and *antherum*, "an anther," the anthers being by turns fertile and barren). Alternate Flower. *Pentandria Monogynia*, Linnæus; *Amaranthaceæ*, Jussieu. Flowers incomplete, inferior; calyx leaves six; stamens five, united into a little cup, with or without intermediate teeth; one or more of the stamens usually abortive; anthers one-celled; stigma in a head.—Spreng. Syst. Veg. I. 818.

I.

STEM ERECT.

1. Narrow-leaved Alternate Flower (*A. angustifolia*, R. Brown). A native of New Holland: leaves line-like, very smooth; flowers in a kind of round heads; calyx woolly on the outside. *Illecebrum angustifolium*, Spreng. Sp. 1.

2. Doubtful Alternate Flower (*A. dubia*, Kunth). A shrub of New Granada: stem branched, smooth; leaves oblong, pointed, clothed, with dense close hair beneath; flowers in terminal very branched panicles; calyx woolly. *Illecebrum dubium*, Sprengel; *Iresin canescens*, Willdenow.—Spreng. Sp. 3.

3. Yellowish Alternate Flower (*A. flavescens*, Kunth). A perennial plant of Cumana: stem inclined to climb; leaves egg-oblong, smooth; flowers in solitary stalked heads; calyx smooth. *Illecebrum flavescens*, Sprengel; *Gomphrena brachiata*, Willd. Herb.—Spreng. Sp. 7.

4. Iresine-like Alternate Flower (*A. Iresinoides*, Kunth). A perennial plant of Cumana: stem branched, clothed with rusty hair; leaves egg-oblong; flowers in panicled spikes; calyx tiled, woolly. *Illecebrum Iresinoides*, Sprengel.—Spreng. Sp. 6.

5. Panicled Alternate Flower (*A. paniculata*, Kunth). A perennial plant of Cumana: stem climbing, smooth; leaves egg-oblong, pointed, rather covered with small stiff uneven hairs; flowers, in panicled heads; calyx smooth. *Illecebrum paniculatum*, Sprengel.—Spreng. Sp. 6.

6. Silky Alternate Flower (*A. sericea*, Kunth). An evergreen stove perennial, about two feet high, from Quito in 1820: stem yielding; leaves oblong, taper-pointed, rather clothed above with small stiff uneven hairs, silky beneath; flowers, in June and July, white, in solitary stalked heads; calyx smooth; propagated by seed in sandy peat. *Illecebrum sericeum*, Sprengel.—Spreng. Sp. 8.

7. Rough Alternate Flower (*A. truscillensis*, Kunth). A perennial plant of Peru: stem yielding; leaves inversely egg-oblong, sharp-pointed, clothed with a kind of woolly dense hair; flowers in oblong, aggregate, stalkless heads; calyx leaves unequal, like the point of a spear, downy at the base. *Illecebrum truscillense*, Sprengel.—Spreng. Sp. 9.

8. Velvety Alternate Flower (*A. villosa*, Kunth). A native of Peru: stem branched; leaves egg-oblong, taper-pointed, clothed with rusty long loose hairs; flowers stalked, in a kind of round, terminal heads; calyx downy. *Illecebrum villosum*, Willd. Herb.—Spreng. Sp. 4.

II.

STEMS LYING DOWN.

9. Chaff Flower (*A. Achyrantha*, R. Brown). An evergreen stove perennial, three inches high, from the West Indies and South America in 1732: stem branched, slightly hairy; leaves inversely egg-oblong, sharp pointed, rather naked; flowers, from June to August, white, smooth, in axillary fascicles; calyx leaves lance-shaped, lengthened, pointed like a spear, rather thorny at the tip; propagated by division in loamy peat. *Achyranthes repens*, Linnæus; *Ach. mucronata*, Lamarck; *Ach. radicans*, Cavanilles; *Illecebrum Achyrantha*, Willdenow; *Paronychia Achyrantha*, Desfontaines.—Dill. Hort. Eltham. Spreng. Sp. 12.

10. Canescent Alternate Flower (*A. canescens*, Kunth). An evergreen stove perennial, six inches high, from Cumana in 1825: stem lying on the ground; leaves line-like, thickish, downy; flowers, in July and August, white, in solitary egg-shaped heads; calyx leaves unequal, hairy at the base; propagated by seed in sandy peat. *Illecebrum canescens*, Sprengel. Spreng. Sp. 21.

11. Caraccas Alternate Flower (*A. Caraccasana*, Humboldt). An evergreen frame perennial, six inches high, from the Caraccas in 1819: flowers, from June to August, white; propagated by seed in sandy peat.

12. Toothed Alternate Flower (*A. denticulata*, R. Brown). A native of Hispaniola and New Holland: leaves spatula-lance-shaped, finely toothed, smooth; flowers axillary; calyx pointed. *Illecebrum denticulatum*, Sprengel.—Spreng. Sp. 18.

13. Fig-leaved Alternate Flower (*A. ficoides*, R. Brown). An evergreen stove perennial, six inches high, from South America in 1821: stem rooting, smooth; leaves spatula-shaped, rather pointed; flowers, in June and July, green, in round axillary hairy heads; calyx taper-pointed, thorny; propagated by seed in rich mould. *Achyranthes ficoidea*, Lamarck; *Illecebrum ficoideum*, Willdenow; *Gomphrena ficoidea*, Linnæus; *Paronychia ficoidea*, Desfontaines.—Jacq. Misc. 60, 4. Spreng. Sp 16.

14. Frutescent Alternate Flower (*A. frutescens*, R. Brown). An evergreen, ornamental, greenhouse shrub, one foot high, from Peru in 1820: stem branching in pairs; leaves oblong, bluntish, covered with a kind of powdery-looking dense hairs; flowers, from June to August, white, in axillary round heads; calyx pointed; propagated by seed in sandy peat. *Achyranthes halimifolia*, Lamarck; *Illecebrum frutescens*, L'Heritier; *Illecebrum limense*, Jacquin.—Spreng. Sp. 14.

15. Lupuline Alternate Flower (*A. lupulina*, Kunth).

A perennial of Peru: stem very much branched; leaves spatula-shaped, pointed, thickish, fringed, smooth; flowers in terminal stalked heads; calyx-leaves blunt, smooth.—Spreng. Sp. 23.

16. Dwarf Alternate (*A. nana*, R. Brown). A native of New Holland: stem spreading, hairy; leaves egg-oblong, hairy; flowers in axillary clusters; calyx taper-pointed, smooth. *Illecebrum nanum*, Sprengel. Sp. 17.

17. Polygonoid Alternate Flower (*A. polygonoides*, R. Brown). An evergreen greenhouse perennial, one foot high, from South America in 1731: stem creeping, hairy; leaves oblong, narrowing at each end, stalked, fringed; flowers, from June to August, smooth; propagated by cuttings in cuttings in rich mould. *Illecebrum polygonoides*, Linnæus; *Gomphrena polygonoides*, Linnæus.—Herm. Par. Bat. 17. Spreng. Sp. 19.

18. Procumbent Alternate Flower (*A. procumbens*, Römer). An evergreen frame perennial, four feet long, from Brazil in 1818: stem lying on the ground, and much larger than with the other cultivated species; flowers, in June and July, white; propagated by seed in sandy peat.

19. Pungent Alternate Flower (*A. pungens*, Kunth). A perennial of the banks of the Orinoko: stem creeping, covered with long loose hairs; leaves inversely egg-oblong, smooth; flowers in roundish stalkless heads; calyx thorny. *Illecebrum pungens.*—Spreng. Sp. 22.

20. Beautiful Alternate Flowers (*A. pulchella*, R. Brown). A perennial native of South America: leaves spatula-lance-shaped; flowers in egg-formed heads; calyx leaves pointed, unequal. *Illecebrum diffusum*, Willdenow. Spreng. Sp. 20.

21. Sitting Alternate Flower (*A. sessilis*, R. Brown). An evergreen stove biennial, six inches high, from the East and West Indies and New Holland in 1778: stem creeping, in rows, downy; leaves lance-shaped, rather entire, smooth; flowers, from July to October, brown, in axillary and nearly stalkless heads; calyx egg-shaped, pointed; propagated by seed in rich mould. *Gomphrena sessilis*, Linnæus.—Van Rheede's Hort. Ind. Malab. 10, p. 11.—Spreng. Sp. 15.

22. Thorny Alternate Flower (*A. spinosa*, Hornmann). A stove annual, about one foot high, introduced in 1823: native country unknown: stem densely and closely hairy, branching in pairs; leaves egg-oblong, thin at each end, turned downwards, slightly clothed, with dense close hair; flowers, in May and June, yellow, in axillary clusters; calyx thorny; propagated by seed in rich mould. *Achyranthes axillaris*, Willdenow; *Illecebrum spinosum*, Sprengel; *Alternanthera axillaris*, De Candolle.—Spreng. Sp. 13. [A. C.]

ALTERNARIA. A genus arranged by Fries under TORULA. [Q. R.]

ALTERNATE (in Latin, *Alternatus*). Branches, leaves, flowers, and the like, are alternate, when arranged upon opposite sides of the stem, or whatever supports them; beginning at different distances from its base, and continuing in nearly equal series. Sometimes they are in three series. [A. C.]

ALTERNATE HUSBANDRY. That sort of management of farms, which has one part in the state of grass or sward, while the other is under the plough, so as to be capable of being changed as there may be occasion, or as the nature of the lands may require. This system of management is supposed to lessen the expense of manure, and keep the land more clear. [H. F.]

ALTERNATELY-PINNATE (in Latin, *Alternatim-pinnatum*). When the leaflets are alternate. [A. C.]

ALTERNATING. When one member or organ is arranged alternately with regard to another; as the leaves of the calyx in the first ten classes of the Linnæan system are mostly alternate with the petals. [A. C.]

ALTERNATIVE (in Latin, *Alternativa*). A term used to express the peculiar situation of leaves in the bud; implying that the pieces being in two rows, the inner is covered by the outer in such a way that each of the outer rows overlaps half of two of the inner. The *lilies* furnish excellent examples. [A. C.]

ALTERNATUS (Latin). Alternate.

ALTHÆA, Cavanilles (from the Greek, ἀλθίω, "I cure," on account of the medical properties of the *Althæa officinalis*). Marsh Mallow and Holly Hock. *Monadelphia Polyandria*, Linnæus; *Malvaceæ*, Jussieu. Calyx five-cleft, and girded by a six or nine-cleft small fence; carpels capsular, one-seeded, disposed in round heads.—De Cand. Prod. I. 436.

I.

MARSH MALLOW (*Althæastrum*). CAPSULES NOTCHED, AND WITHOUT MEMBRANOUS MARGINS; CALYX FENCE SMALL, GENERALLY EIGHT OR NINE-CLEFT.

1. Hemp-like Marsh Mallow (*A. cannabina*, Linnæus). A hardy perennial, six feet high, from the South of France, Italy, and Hungary in 1597: leaves hairy, the lower ones with finger-like divisions, the upper ones three-parted, the lobes narrow and coarsely toothed; flowers, in June and July, rose-coloured, on lax axillary many-flowered stalks, longer than the leaves; propagated by division in common earth.—Cav. Diss. 2, p. 94. Tab. 30. D. C. Sp. 4.

2. Hairy Marsh Mallow (*A. hirsuta*, Linnæus). A hardy annual, one to two feet high, a native of many parts of Europe, and very abundant in the hedges of cultivated fields near Cobham Hall, in Kent: stem covered with stiff hairs; leaves heart-shaped, covered with rough hairs beneath, smooth above, the lower leaves lobed, the upper ones three to five-lobed; flowers, in June and July, pinkish, or almost white, on stalks which are one-flowered and longer than the leaves; propagated by seed in common earth.—Cav. Diss. 2, p. 95. Tab. 28. Fig. 1. D. C. Sp. 3.

3. Ludwig's Marsh Mallow (*A. Ludwigii*, Linnæus). A hardy ornamental annual, two feet high, from Sicily and Egypt in 1791: leaves round, heart-shaped, lobed, toothed, smooth; flowers, in June or July, white or pinkish, on axillary, crowded, and one-flowered stalks; propagated by seed in common garden earth.—Cav. Diss. 2, p. 96. Tab. 30. Fig. 3. D. C. Sp. 6.

4. Narbonne Marsh Mallow (*A. Narbonensis*, Poiret). hardy perennial, four or six feet high, from Narbonne in 1780: leaves hairy or downy, the lower leaves five or seven lobed, the upper three-lobed; flowers, in August and September, of a pale red colour, on lax many-flowered, and longer than the leaves, stalked; propagated by division in common earth.—Poir. in Cav. Dis. 2, p. 94. Tab. 2. Fig. 2. D. C. Sp. 3.

5. Common Marsh Mallow (*A. officinalis*, Linnæus). A hardy perennial, about four feet high, very common in the salt marshes of this country: leaves heart-shaped or egg-oblong, toothed, undivided or inclined to be five-lobed, covered with soft down; flowers, from July to September, of a pinkish colour, on axillary, many-flowered stalks, much shorter than the leaves. The whole plant abounds with mucilage.—Eng. Bot. Tab. 147. D. C. Sp. 1.

6. Turin Marsh Mallow (*A. Taurinensis*, De Candolle). An ornamental perennial, four feet high, from the hill near Turin in 1817: leaves three-cut, or rather three-parted, clothed with soft white starry down; flowers, in August and September, pinkish, on straight axillary, many-flowered stalks, rather longer than the leaves; propagated by division in common earth.—D. C. Sp. 2.

II.

HOLLYHOCK (*Alcea*). CAPSULES SURROUNDED BY A MEMBRANOUS FURROWED MARGIN; CALYX FENCE SMALL, SIX OR SEVEN-CLEFT.

7. Stemless Hollyhock (*A. Acaulis*, Cavanilles). An ornamental hardy annual, three to eighteen inches high, from Syria in 1680: almost stemless; leaves roundish, heart-shaped, rather five-angled, having five notches; flowers, in June and July, pale yellow, on one-flowered stalks, much shorter than the leaf-stalks; petals with a small notch at the tip, and bearded at the base; propagated by seed in common earth.—Cav. Diss. II. Tab. 27, fig. 3. D. C. Sp. 7.

8. African Hollyhock (*A. Africana*, Loureiro). An ornamental greenhouse shrub, four feet high, native of the eastern coast of Africa: stem covered with stiff hairs; leaves three-lobed, notched; flowers scarlet, stalked, axillary, solitary; calyx fence six parted. *Alcea Africana*, Loureiro.—D. C. Sp. 13.

9. Caribbean Hollyhock (*A. Caribæa*, Sims). An evergreen, ornamental frame biennial, three feet high, from the Caribbee Islands in 1816: stem straight, covered with long stiff hairs; leaves roundish, heart-shaped, lobed, with toothed round notches; flowers, in March and April, rose-coloured, with a yellow base, solitary, and nearly destitute of flower-stalks; petals rather inversely heart-shaped, with bearded claws; propagated by seed in common earth.—Bot. Mag. Tab. 1916. D. C. Sp. 8.

10. Coromandel Hollyhock (*A. Coromandeliana*, Cavanilles). A native of Pondichery: stem upright, leaves rather triangular, notched, blunt, five-ribbed, inclined to be three-lobed; flowers fresh-coloured, solitary, axillary, nearly destitute of stalks; petals broad-oblong.—D. C. Sp. 14.

11. Twisted Hollyhock (*A. flexuosa*, Sims). An evergreen ornamental stove perennial, three feet high, from the East Indies in 1803: stem rather twisted, clothed with stiff hairs; leaves heart-shaped, rather seven-lobed, blunt, on long stalks; petals inversely heart-shaped; propagated by division in common earth.—Bot. Mag. Tab. 892. D. C. Sp. 15.

12. Fig-leaved or Antwerp Hollyhock (*A. ficifolia*, Cavanilles). A hardy ornamental biennial, six feet high, from the Levant in 1597: stem upright, slightly hairy; leaves divided beyond the middle into seven lobes; lobes oblong, blunt, and irregularly toothed; flowers, from June to September, large, yellow, or orange, in terminal spikes; calyx fence small, nearly one half shorter than the calyx; propagated by seed in common earth. *Alcea ficifolia*, Linnæus. Cav. Diss. 2. Tab. 28. Fig. 2. D. C. Sp. 16.

13. Frolove's Hollyhock (*A. Froloviana*, Fischer). A hardy ornamental biennial, three to six feet high, from Siberia in 1824. It has never flowered in this country.—Fischer's MSS.

14. Lavatera-leaved Hollyhock (*A. lavateræfolia*, De Candolle). An ornamental hardy biennial(?), four feet high, found about the base of Mount Lebanon, near Seyde: stem upright, slightly hairy; leaves downy. divided beyond the middle into finger-like lobes, the lobes oblong, blunt, and irregularly toothed; flowers yellow; calyx fence small, almost as long as the calyx.—D. C. Sp. 17.

15. White-flowered Hollyhock (*A. leucantha*, Fischer). A hardy ornamental biennial(?), six feet high, from the Altaian mountains in 1824: stem, leaf-stalks, and flower-stalks, covered with stiff hairs; leaves roundish-heart-shaped, five-angled, or three-lobed, notched, and slightly hairy; flowers two together, in July and August, white, with a greenish yellow base, in clusters, naked; petals wedge-shaped, with a notch at the end; calyx fence half as long as the calyx; propagated by seed in common earth. *Althæa nudiflora*, Lindley.—Fischer's MSS.

16. Pale-flowered Hollyhock (*A. pallida*, Waldstein and Kitaibel). A hardy ornamental biennial, four or six feet high, from Hungary in 1805: stem upright, covered with stiff hair; leaves roundish-heart-shaped; flowers, in July and August, whitish-purple; petals two-lobed; partial fence small, equal in length to the calyx; propagated by seed in common earth.—D. C. Sp. 10.

17. Rose, or Common Hollyhock (*A. rosea*, Cavanilles). A hardy ornamental biennial, six or eight feet high, from the Levant in 1573: stem upright, hairy; leaves heart-shaped, notched, rough, five or seven-angled; flowers, from July to September, rose-coloured, large, axillary, without stalks, inclined to be spiked at the top; petals slightly notched, with velvety claws; propagated by seed in common earth. *Alcea rosea*, Linnæus.—Cav. Diss. II. Tab. 29, fig. 3.—D. C. Sp. 11.

In our gardens there are several varieties of this species of *Hollyhock*, bearing single or double flowers, and varying much in colour, as white, red, scarlet, buff-coloured, blackish red, yellow, and sometimes, though rarely, variegated. The *A. rosea biloba*, known among gardeners as the *Althæa grandiflora*, is also a variety, having its petals bluntly two-lobed, and the flowers much smaller.—D. C.—See BIENNIALS.

18. Sieber's Hollyhock (*A. Sieberi*, Hort). An ornamental deciduous biennial, three feet high, from Italy in 1829: flowers, from July to October, purple; propagated by seed in common soil.

19. China Hollyhock (*A. Sinensis*, Cavanilles). A hardy ornamental annual, one to four feet high, from China in 1818, differing from the *A. rosea* in the root being annual, the stem much shorter, and the flowers rather larger: stem upright, smooth, branched below; leaves heart-shaped, rough, notched, angular; flowers, in July, rose-coloured; propagated by seed in common earth.—Cav. Diss. II. Tab. 29, fig. 3.—D. C. 12.

20. Striped Hollyhock (*A. striata*, De Candolle). An ornamental hardy biennial, five feet high, the native country not known: stem covered with spreading down, inclined to be smooth: leaves heart-shaped, bluntly three-lobed, with round notches; flowers, in July and August, white or pale, two inches and a half in diameter, on short, solitary stalks; petals inverse-heart-shaped; fence small, one-half shorter than the inner calyx; lobes of the calyx with seven stripes; propagated by seed in common earth.—D. C. Sp. 9.

III.

WRINKLE MALLOW (*Alphæa*). CAPSULES WRINKLED FROM SMALL RIBS, AND NOT MARGINED; CALYX FENCE SMALL, FIVE-CLEFT.

21. Burchell's Wrinkle Mallow (*A. Burchellii*, De Candolle). A native of the Cape of Good Hope: stem upright, slightly hairy; leaves heart-shaped, inclined to be five-lobed, coarsely toothed, velvety; flowers unknown, on axillary, one-flowered stalks, which are scarcely shorter than the leaf-stalks; fence of calyx five-cleft. *Urena pilosa*, Burchell.—D. C. Sp. 18.

22. Bourbon Wrinkle Mallow (*A. Borbonica*, De Candolle). A species very similar to the *A. Burchellii*, a native of the island of Bourbon: stem upright, downy below, velvety above; leaves velvety, heart-shaped, some five-lobed, coarsely toothed; flowers unknown, on axillary, one-flowered stalks, which are twice the length of the leaf-stalks; calyx fence small, with fringe-like hairs at the base.—D. C. Sp. 19.

[A. C.]

ALTHÆINE. In vegetable physiology, an alkaloid procured from the roots of the marsh mallow, and described by M. Bacon (*Journ. Chim. Méd.* II. 551). It is apparently identical with ASPARAGINE. [F. D.]

ALTHERIA, Du Petit Thouars (a name altered from *Waltheria*, a genus from which it was separated). Alther's Shrub. *Monadelphia Pentandria*, Linnæus; *Byttneriaceæ*, Jussieu. Calyx five-cleft, girded by a three-leaved small calyx fence; petals five; stamens five, united into a tube; seed-organ five-sided; styles five, joined; capsules five, joined, one-seeded.

1. Madagascar Alther's Shrub (*A. Madagascariensis*, De Candolle). An erect, hairy plant, a native of Madagascar, two feet high, with heart-shaped, toothed leaves, and small axillary yellow flowers; propagated by cuttings in sand, peat, and loam. *Visenia Madagascariensis*. [A. C.]

ALTINGIA, Noronha (supposed to be named after *Alting*, a German botanist). Alting's Tree. *Dioecia Monadelphia*, Linnæus; *Coniferæ*, Jussieu. Male flower; catkin globular; scales four together, leathery; filaments drooping. Female flower; scales of the cone with two pistils; style bending inwards; seeds gristly, solid.—Spreng. Syst.Veg. III. 888.

1. Tall Alting's Tree (*A. excelsa*, Noronha). An evergreen, ornamental, greenhouse tree, about one hundred feet high, from Norfolk Island in 1796: the trunk sometimes thirty feet thick; branches erect; leaves alternate, stalked, oblong, pointed, saw-toothed, leathery; flowers without petals; the catkins terminal and clustered; propagated by seed in peaty loam. *Araucaria excelsa*, Hort. Kew.—Lamb. Pin. I. 39, 40.

2. Cunningham Alting's Tree (*A. Cunninghami*, G. Don). An evergreen, ornamental, greenhouse tree, thirty feet high, from New Holland in 1824: flowers without petals; propagated by seed in peat and loam. [A. C.]

ALTITUDE (in Latin, *Altitudo*, from *Altus*, "high"). In vegetable physiology, altitude or elevation of surface above the level of the sea, is equivalent to a receding, whether north or south, from the line of the equator, 600 feet of altitude being thought to be equal to a degree. Hence it follows that all varieties of climate, and consequently all varieties of vegetable habitat, may exist even in the same latitude, merely by means of variety in the altitude of the spot. This was found by Tournefort to be literally the fact, during his travels in Asia. At the foot of Mount Ararat he met with plants peculiar to Armenia; above these he met with plants which are found also in France; at a still greater height he found himself surrounded with such as grow in Sweden, and at the summit with such as vegetate in the polar regions. Baron Humboldt, in his Personal Narrative, gives us a similar account of the several zones of vegetation existing in a height of 3730 yards on the ascent of Mount Teneriffe. The first zone is the region of vines, extending from the shores of the ocean to a height of from 400 to 600 yards, well cultivated, and producing date trees, plantains, olives, vines, wheat. The second zone is the region of laurels, extending from about 600 to about 1800 yards, and producing many plants with showy flowers, with moss and grass beneath. The third zone is the region of pines, commencing at 1920 yards, and having a breadth of 850 yards. The fourth zone is the region of *Retama*, or broom, growing to a height of nine or ten feet, and fed on by wild goats. The last zone is the region of grasses, scantily covering the heaps of lava, with cryptogamic plants intermixed, and the summit of the mountain bare.

This accounts for the great variety of plants which is often found in no great extent of country; and it may be laid down as a botanical axiom, that the more diversified the surface of the country, the richer it will be in species, at least in the same latitudes. It accounts, also, for the want of correspondence between plants of different countries, though placed in the same latitudes; because the mountains, or ridges of mountains, which may be found in the one and not in the other, will produce the greatest possible difference in the character of the genera and species. To this cause we may ascribe the diversity that often actually exists between plants growing in the same country and in the same latitudes; as between those of the north-west and north-east coasts of North America, as also of the south-west and south-east coasts; the former being more mountainous, the latter more flat. Sometimes the same sort of difference takes place between the plants of an island and those of the neighbouring continent; that is, if the one is flat and the other mountainous; but if they are alike in their geographical delineation, they are generally alike in their vegetable productions. (See ALPINE, and CLIMATE.) [L. K.]

ALUM (in Latin, *Alumen*). The super-sulphate of alumina and potass, obtained from slate clay by roasting, adding potass ley or urine, and then evaporating. There are several varieties, common alum, roche alum, and Roman alum, which is reddish. A very extraordinary mistake with respect to alum occurs in the *Complete Farmer*, where it is stated, on the authority of Lord Dundonald, that Dr. Home of Edinburgh "found no beneficial effects from the application of alum to garden mould." On referring, however, to Lord Dundonald, and also to Dr. Home's work, we find that the experiments were not made with alum, but with "vitriolated tartar," or sulphate of potass.

According to M. De Candolle, the solutions of alum appear to be injurious to vegetation, though he is not acquainted with any detailed experiments on the subject. M. Lefebvre accounted sulphate of alumine among the substances in which radish seed would not germinate. M. Röper observed at Frienwald, in Prussia, heaps of earth composed of the materials from which alum had been extracted, and though exposed to the open air, they remained sterile, and exhibited no vegetation. Weigmann, on the other hand, alleges that alum is not at all injurious to vegetation. (*Isis*, 1826. p. 165.) [B. E.]

ALUM. In veterinary practice, alum, in powder, is sometimes used externally for destroying trifling excrescences, for arresting bleeding, and the like. A little, very finely powdered, is occasionally blown through a quill into the eye for the purpose of removing specks of long standing. Internally, alum is administered in from one to two drachm doses, with other astringents, in diarrhœa, diabetes, and other immediate discharges.

Alum Lotion is prepared by dissolving from six to eight drachms of alum powder in two pints of water. This

forms an inexpensive and tolerably efficacious application for mild forms of grease, cracks in the heels of horses, and for superficial sores of all kinds. It should not be used till the surrounding inflammation has been subdued by time or proper remedies. In its weakest state, the alum lotion is serviceable in the cankered ear of dogs, and wounds or ulcers of the mouth in any animal.

Alum Ointment is composed of one drachm of the powder to one ounce each of turpentine and hog's-lard, incorporated by heating. This supplies the place of the lotion when the sores are apt to become dry and hard. It is, however, very little used.

Alum whey is prepared by throwing two drachms of the powder into two pints of hot milk. It is given internally as an astringent, either by the mouth, the vent-gut (*rectum*) or vagina, according to circumstances. It now and then succeeds in diarrhœa, after other and better astringents have failed.

Burnt alum is made by boiling a solid piece of the salt on an iron plate over a fire till it becomes quite dry and white, taking care not to make the heat so strong as to decompose it. This is somewhat milder than the alum in powder, and is therefore sometimes substituted for it when wanted for specks in the eye. [C. S.]

ALUMINE (in Latin, *Alumina*). In vegetable physiology, a chemical principle, said (but not proved) to have a metal called *aluminium* for its base. It is only found in plants in small quantity. M. Schröder found it in a pure and free state in very small quantity in the grain of barley, oats, rye, particularly in wheat, and also in the straw of rye. Alumine is also found in the ashes of many plants; but according to M. Th. de Saussure, it scarcely forms one hundredth part. It has been found in opium, in the juice of celandine, in the root of marsh mallow, in indigo, in assafœtida, in safflower, in wormwood, in olive leaves, in garlic, in the dust of lycopodium, in male fern root, &c. [F. D.]

ALUMINOUS SOILS. Those soils which contain much barren clay are sometimes termed aluminous. One reason of the infertility of such soils may arise from the known tendency of aluminous substances (should such really exist) to check putrefaction in the vegetable refuse in the soil, as has been said to occur in some burying-grounds. It is well known, when the roots of trees penetrate to such an under soil, that they rot and die, a marked instance of which was communicated to Dr. Darwin by Mr. Wedgewood, of Etruria, whose fruit trees were much injured by their roots getting down to an aluminous under-soil, where, as the Doctor imagined, they were corroded by sulphuric acid. [B. E.]

ALUTACEOUS (in Latin, *Alutaceus*, from *Aluta*, "leather"). Leathery, or having the consistence of leather. When the word is used to express colour, it means leather-yellow, or whitish yellow. [A. C.]

ALVEOLATE (in Latin, *Alveolatus*, from *Alvear*, "a bee-hive"). Having cells so as to resemble a honey-comb, with more or less of each seed imbedded in it. [A. C.]

ALVEOLI (Latin, from *Alvear*, "a honey-comb). In veterinary anatomy, the bony sockets containing the fangs of the teeth. [C. S.]

ALVINE (from the Latin, *Alvus*, "the belly"). Belonging to the belly, as alvine discharge, a term in veterinary writings for the excrements. [C. S.]

ALYPO. The specific name of the *Globularia Alypum*. [A. C.]

ALYSICARPUS, Necker (from the Greek, ἁλυσις, "a chain," and καρπος, "fruit;" the seed-vessel having the appearance of a chain). Chainseed. *Diadelphia Decandria*, Linnæus; *Leguminosæ*, Jussieu. Calyx bell-shaped, five-cleft, permanent, the segments equal, lance-shaped, and acute; the corolla small, hardly longer than the calyx, pea-blossom shaped; stamens two long, two short; pod chain-like.

I.

JOINTS OF THE PODS SMOOTH, OR IRREGULARLY NERVED.

1. Hare's-ear Chainseed (*A. bupleurifolius*, De Candolle). A bark-stove, ornamental perennial, about one foot high, from the East Indies in 1793: plant smooth; leaves lance-shaped, line-like, acute; leaf-scales rather shorter than the leaf-stalk; lobes of the calyx covered with spreading down; flowers, from June to August, purple; pod round and long, and like a necklace, a little longer than the calyx, smooth, with two to four joints; propagated by seed in loam and peat. *Hedysarum rugosum*, Sieber; *H. bupleurifolium*, Linnæus; Burmann, Roxburgh, Sims; *H. graminеum*, Retzius, Wendland; *H. Cochinchinense*, Schrank. —De Candolle, Sp. 1.

Burmann describes a variety (*hybridus*) in which the lower leaves are roundish, as in *A. nummularifolius*, and the upper leaves oblong and acute, as in *A. bupleurifolius*; the upper leaf-scales also longer than the leaf-stalks.—Burm. Herb. D. C. l. c.

2. Husky Chainseed (*A. glumaceus*, De Candolle). A smooth, procumbent, greenhouse perennial of Arabia Felix: leaves lance-shaped and pointed; leaf-scales of the same length as the leaf-stalks; flowers yellow, but reddish within; pod four to six-jointed, roundish, flattish, and wrinkled; propagated by cuttings or seed in loam and peat. *Hedysarum glumaceum*, Vahl. Symb. II. p. 106, Willdenow; *H. violaceam*, Forskal.—D. C. Sp. 5.

II.

PODS JOINTED, FURROWED, AND WRINKLED TRANSVERSELY.

3. Necklace Chainseed (*A. monilifer*, De Candolle). A bark-stove, ornamental perennial, about two feet in length, from the East Indies and the Mauritius in 1816: stem prostrate, covered with stiff hairs; leaves elliptic-roundish, hairy beneath; leaf-scales as long as the leaf-stalks; flowers, in July and August, purple; pod round and long, velvety, four to five-jointed, and much longer than the calyx; propagated by cuttings or seed in sandy loam. *Hedysarum moniliferum*, Linnæus, Burmann.—D. C. Sp. 4.

4. Money-wort Chainseed (*A. nummularifolius*, De Candolle). A bark-stove perennial, about one foot high, from the East Indies and the Mauritius in 1777: plant smooth; leaves egg-oblong or roundish; flowers, from July to September, purple; pod rather flat, smoothish, five to six-

jointed, and much longer than the calyx; propagated by seed in loam and peat. *Hedysarum nummularium*, Linnæus; Burmann; *H. cylindricum*, Poiret, Petiver.—D. C. Sp. 3.

5. Sheathed Chainseed (*A. vaginalis*, De Candolle). A bark-stove annual, one foot high, from the East Indies and Senegal in 1790: stem covered with short hairs; the leaves rather heart-shaped at the base, oval or oblong, smooth, the margin and middle ribs rather hairy; leaf-scales as long as the leaf-stalks; flowers, appearing in July and August, red; pod round and long, four to five-jointed, rather hairy, and much longer than the calyx; propagated by seed in loam and peat. *Hedysarum vaginale*, Linnæus; *H. ovalifolium*, Sieber.—D. C. Sp. 2.

6. Styrax Chainseed (*A. styracifolius*, De Candolle). A stove evergreen under-shrub, two feet high, from the East Indies and the Mauritius in 1796?: stem covered with long loose hair; leaves egg-oblong, blunt, hairy beneath; leaf-scales as long as the leaf-stalks; flowers, in July and August, red or purple; the pod with three or four joints, smooth, and a little longer than the calyx; propagated by cuttings in loam and peat. *Hedysarum styracifolium*, Linnæus; *A. cylindricus*, Desvaux.—D. C. Sp. 6.

7. Wrinkle-podded Chainseed (*A. rugosus*, De Candolle). A stove perennial, about one foot high, a native of Guinea: stem smooth, with a hairy line the whole length; the leaves are line-like, lance-shaped, blunt, hairy beneath and on the margins; leaf-scales longer than the leaf-stalks; flowers red; pod with four or five joints; propagated by seed or cuttings in light rich soil. *Hedysarum rugosum*, Willdenow.—D. C. Sp. 7. [A. C.]

ALYSSINEÆ, De Candolle. A division of *Cruciferæ*, characterised by a pod opening lengthways, with plane or convex valves and flattish seeds, often margined. [B. E.]

ALYSSOIDES. The term which Moench adopted for the genus *Alyssum*. [A. C.]

ALYSSUM, R. Brown (from the Greek, *α*, privative, and *λυσσα*, "rage," the plant *Alyssum*, being anciently supposed to have the power of allaying anger). Mad-wort. *Tetradynamia Siliculosa*. Linnæus; *Cruciferæ*, De Candolle. Pod roundish, the valves convex in the disk, appearing as if bit off at the tip; cells two-seeded: seeds girded by a membranaceous wing; petals with a small notch at the tip; stamens, all or some, toothed; annual herbs, grey from starry down; flowers small, yellow, in terminal clusters.—De Cand. Prod. Vol. I. p. 162.

I.

FLOWERS YELLOW; SEEDS ONE OR TWO IN EACH CELL; ALL THE STAMENS, OR SOME OF THEM, TOOTHED. ADYSETON, *Scopoli*.

1. *Shrubs and Perennials.*

1. Alpine Madwort (*A. alpestre*, Linnæus). A hardy tufted perennial, three inches high, from the Alps of Europe in 1825: stems greyish; leaves inversely egg-oblong, hoary; flowers, in June and July, yellow, in simple clusters; pods oblong and inversely egg-shaped, greyish, with flat valves; propagated by division in common earth.—All. Ped. No. 888, T. 18, f. 2. D. C. Sp. 14.

2. Silvery Madwort (*A. argenteum*, Vittman). A hardy, ornamental undershrub, one foot high, from the rocky and sunny places on the lower Alps of Piedmont in 1819: stems hoary, with starry down; leaves oblong-starry-shaped, silvery beneath; flowers, in May and June, yellow; pods roundish-egg-shaped, flattish, velvety; propagated by division in common earth. *Lunaria argentea*, Allioni.—All. Ped. No. 901, T. 54, f. 3.

3. Atlantic Madwort (*A. Atlanticum*, Desfontaines). A hardy, ornamental, under-shrub, six inches high, from Crete and Mount Atlas in 1820: stem hoary, erect; leaves lance-shaped, hoary, hairy; flowers, in June and July, yellow, in simple clusters; pods round, hoary; propagated by cuttings in common earth.—Desf. Atl. II. T. 149. D. C. Sp. 9.

4. Bertolini's Madwort (*A. Bertolinii*, Desvaux). A hardy, ornamental under-shrub, one foot high, from Italy in 1825?: stems grey, with starry down; leaves inversely egg-oblong, silvery beneath; flowers, in May and June, yellow; pods oval, flattish, grey; seeds not margined; propagated by division in common earth.—D. C. Sp. 6.

5. Wedge-leaved Madwort (*A. cuneifolium*, Tenore). A hardy, ornamental perennial, three inches high, from Naples in 1820: stem downy; leaves rather hoary, rather egg-oblong, wedge-shaped; flowers, from May to August, yellow, in simple bunches; pods egg-shaped; propagated by division in common earth.—D. C. Sp. 20.

6. Diffuse Madwort (*A. diffusum*, Tenore). A hardy, ornamental perennial, three inches high, from Naples in 1820: stems diffuse, grey; leaves hoary; lower leaves rather inversely egg-oblong; upper leaves line-lance-shaped, narrowing at both ends; flowers, from May to August, yellow, in simple clusters; pods egg-shaped; propagated by division in common earth: very like *A. cuneifolium*.—D. C. Sp. 20.

7. Fischer's Madwort (*A. Fischerianum*, De Candolle). A hardy, Siberian perennial, three inches high: stem and leaves grey; lower leaves inversely egg-oblong, upper leaves oblong; flowers yellow, with petals twice as long as the calyx; pods round, hoary.—D. C. Sp. 24.

8. Gemona Madwort (*A. Gemonense*, Linnæus). A hardy, ornamental under-shrub, one foot high, from Italy, Austria, and Carinthia in 1710: stem panicled; leaves lance-shaped, entire, greyish, velvety from starry down; flowers, in April and May, yellow; pods round, two to four-seeded; seeds margined; propagated by cuttings in common earth. *Vesicaria Gemonensis*, Poiret.—Jacq. Icon. III. T. 503. D. C. Sp. 2.

9. Elwind Madwort (*A. gnaphalodes*, De Candolle). A hardy shrub, six inches high, from Mount Elwind, in Persia: stems dwarf; leaves oval, velvety; those on the branches line-like; flowers, from May to October, yellow, in simple clusters; calyx closed; pods oval, velvety.—D. C. Sp. 25.

10. Woolly Madwort (*A. lanigerum*, De Candolle). A hardy shrub, six inches high, a native of Persia: stem tufted, woolly; leaves woolly; flowers small, with inversely egg-oblong petals, in bunchy clusters; pods oval, velvety; propagated by cuttings in common earth. D. C. Sp. 18.

11. Lena Madwort (*A. Lenense*, Adams). A hardy perennial, six inches high, found on the banks of the river Lena, in Siberia: stem grey or hairy; leaves tiled, lance-shaped, grey or hoary; flowers, with yellow inversely egg-oblong petals, in short simple clusters; pods egg-shaped, downy; propagated by cuttings in common earth. *A. imbricatum*, Schlechtendahl. D. C. Sp. 17.

12. Marshall's Madwort (*A. Marschallianum*, Andrzejowski). A hardy ornamental perennial, six inches high, from the Caucasus in 1820?: stem erect, hoary; leaves hoary; lower leaves inversely egg-oblong; upper leaves oblong-line-like; flowers, from April to July, yellow, in simple clusters; pods oval, grey, with convex valves: propagated by division in common earth. *A. alpestre*, Bieberstein.—D. C. Sp. 16.

13. Mountain Madwort (*A. montanum*, Linnæus). A hardy ornamental perennial, six inches high, from hilly and sunny places of Germany in 1713: stem downy; leaves rather hoary; lower ones inversely egg-oblong, upper ones oblong; flowers, from May to September, yellow, in simple clusters; petals double the length of the calyx; pods round; propagated by division in sandy loam. *Clypeola montana*, Crantz.—Bot. Mag. 419. D. C. Sp. 19.

Var. a. Whitish (*Albescens*, Schlechtendahl). Plant larger, and the flower smaller. *A. montanum*, Bieberstein.

Var. b. Sandy (*Arenarium*, Loiseleur Dealongchamps). Leaves rounder.

14. Wall Madwort (*A. murale*, Waldstein). A hardy

ornamental shrub, one foot high, from old walls in Hungary, in 1820: stems grey from starry down; leaves oblong, rather acute, white beneath; flowers, in July and August, yellow; pods egg-shaped, rather velvety; seeds not margined; propagated by division in common earth.—W. and K. Hung. I. T. 6. D. C. Sp. 7.

15. Nebrode Madwort (*A. Nebrodense*, Tineo). A hardy shrub, six to twelve inches high, a native of Sicily: stem ascending; leaves inversely egg-oblong, hoary; flowers, in June and July, yellow, in bunchy clusters; pods rather oval, with flat valves; propagated by cuttings in common earth.—D. C. Sp. 15.

16. Blunt-leaved Madwort (*A. obtusifolium*, Steven). A hardy ornamental under-shrub, nine inches high, from Tauria in 1812: stem clothed with starry down; leaves inversely egg-oblong, spatula-like, blunt, silvery beneath; flowers, from June to August, yellow; pods roundish, egg-shaped, rather velvety; propagated by cuttings in common earth. *A. murale*, Bieberstein, not Waldstein.—Deless. Icon. II. T. 38. D. C. Sp. 8.

17. Olympic Madwort (*A. Olympicum*, Hort.). A hardy ornamental perennial, two inches high, from Mount Olympus? in 1700: flowers, in June and July, yellow; propagated by division in common earth.

18. Oriental Madwort (*A. Orientale*, Arduini). A hardy ornamental under-shrub, one foot high, from the mountains in Crete in 1820: stems panicled; leaves lance-shaped, abrupt, and bluntly toothed, waved, downy; flowers, in May and June, yellow; pods nearly round, four-seeded; seeds margined; propagated by cuttings in common earth. *Clypeola tomentosa*, Linnæus.—Ard. Spec. II. T. 15, f. 1. D. C. Sp. 3.

19. Petaloid Madwort (*A. petaloides*, De Candolle). A hardy Syrian shrub, three inches high: stems hairy, erectish; leaves oblong, narrowing at the base, hairy, lower ones toothed; flowers, from May to August, in simple clusters; petals with claws longer than the calyx; pods egg-shaped, with velvety margins.—D. C. Sp. 26.

20. Creeping-rooted Madwort (*A. repens*, Baumgarten). A hardy shrub, six inches high, from rocky districts in Transylvania: root creeping; stem, when young, lying on the ground, afterwards erect; leaves rather hairy; lower leaves oblong, and inversely egg-oblong; upper leaves oblong; flowers, from April to June, yellow; pods round, one-seeded; propagated by division in common ground.—D. C. Sp. 11.

21. Savranic Madwort (*A. Savranicum*, Andrzejowski). A hardy shrub, six inches high, of Podolia: stems diffuse, ascending; leaves spatula-line-like, downy and starry above, densely velvety beneath; flowers, in May and June, small; pods hoary with down; propagated by division in common earth.—Spreng. Syst. Veg. II. p. 305.

22. Rock Madwort (*A. saxatile*, Linnæus). A common hardy shrub, one foot high, from Russia in 1710; stem rather bunchy; leaves lance-shaped, entire, velvety; flowers, in April and May, yellow; pods inversely egg-shaped; seeds margined; propagated by cuttings in sandy loam. *Aurilia, saxatilis*, Desvaux.—Bot. Mag. 159. D. C. Sp. 1.

23. Wild-thyme-leaved Madwort (*A. serpyllifolium*, Desfontaines). A hardy ornamental under-shrub, six to twelve inches high, from Algiers in 1820: stem, hoary, erect; leaves hoary; lower leaves inversely egg-oblong; upper leaves lance-shaped; flowers, from May to July, yellow, in bunches; pods rather wedge-shaped, hoary, with flat valves; propagated by cuttings in common earth.—D. C. Sp. 10.

24. Siberian Madwort (*A. Sibiricum*, Willdenow). A hardy Siberian perennial, three inches high: stems bunchy; leaves and pods inversely-egg-shaped, blunt, dotted with starry hairs; flowers small; style three times shorter than the pod.—D. C. Sp. 23.

25. Spatula-leaved Madwort (*A. spatulatum*, Stephan.). A hardy ornamental under-shrub, six inches high, from the mountains in Siberia in 1821: leaves spatula inverse-egg-shaped, greyish velvety; flowers, in April and May, yellow; pods round, little longer than the style; seeds margined; propagated by cuttings in common earth. *Alyssum cretaceum*, Adams.—Deless. Icon. II. T. 37. D. C. Sp. 4.

26. Twisted Madwort (*A. tortuosum*, Waldstein). A hardy perennial, six inches high, from Hungary in 1804: stems twisted, hoary; leaves hoary, rather lance-shaped; flowers, in June and July, yellow, in bunchy clusters; pods oval, greyish velvety, with flat valves; propagated by division in sandy loam.—W. and K. Hung. I. T. 91. D. C. Sp. 13.

Var. a. Oriental (*A. Orientale*, De Candolle). A native of Armenia, and of Tauria and Iberia; stems more shrubby at the base, and the leaves more hoary. *A. subalpinum*, Pallas; *A. serpyllifolium*, Bieberstein.

27. Spring Madwort (*A. vernale*, Harnemann). A hardy ornamental perennial, six inches high, introduced in 1823: stems ascending; leaves lance-shaped, nearly entire, greyish from starry down; flowers, in April and May, yellow; petals with a notch at the end; pods inflated, hairy; propagated by cuttings in common earth. Very like *A. repens*, Schrank. Hort. Mon. T. 96. D. C. Sp. 12.

28. Wulfen's Madwort (*A. Wulfenianum*, Willdenow). A hardy ornamental perennial, three inches high, from Carinthia in 1821: stems grey; leaves dotted, grey; lower leaves inversely egg-oblong; upper leaves lance-shaped; flowers, from May to September, yellow, in simple clusters; pods oval; propagated by division in common earth.—D. C. Sp. 22.

2. *Annuals.*

29. Calycine Madwort (*A. calycinum*, Linnæus). A hardy uninteresting annual, six inches to one foot high, from dry fields in the South of Europe in 1740: stem spreading; leaves line-like, lance-shaped, hoary; flowers, from June to August, yellow, when old, whitish; calyx lasting; pods round, downy, four times the length of the style; propagated by seed in sand and peat. *Alypum alypoides*, Gonan; *A. campestre*, Hoffmansegg.—Jacq. Fl. Austr. T. 338. D. C. Sp. 32.

30. Field Madwort (*A. campestre*, Linnæus). A hardy uninteresting annual, three inches to one foot high, from sandy fields in the south of Europe in 1768: stem spreading; leaves lance-shaped, inclined to be line-like, hairy; flowers, from June to August, yellow, in long clusters; petals longer than the calyx; pods round, six times the length of the style; propagated by seed in sand and peat. *Mœnchia campestris*, Roth.—Sibth. and Smith. Fl. Græc. T. 626. D. C. Sp. 31.

31. Dense-flowered Madwort (*A. densiflorum*, Desfontaines). A hardy annual, nearly one foot high, a native of America: leaves narrow, lance-shaped; flowers small, white, crowded into dense round-oblong clusters; pods round, downy, one or two-seeded; propagated by seed in common earth.—Desf. Cor. Tourn. T. 48. D. C. Sp. 48.

32. Brownish Madwort (*A. fulvescens*, Smith). A hardy annual, three inches high, a native of the Morea and the Islands of Cyprus and Scio; stem first trailing, then erect; root-leaves inverse-egg-shaped, stalked, grey; stem-leaves oblong; petals inversely-egg-oblong, brownish when dry; calyx lasting; pods globular-egg-shaped, smooth; propagated by seed in common earth.—D. C. Sp. 36.

33. Clustered Madwort (*A. glomeratum*, Burchell). A hardy annual, three inches high, a native of the Cape of Good Hope: stem first trailing on the ground, then rising upright; leaves lance-shaped, blunt, clothed with long soft hairs; flowers in crowded clusters; petals oblong, a little longer than the calyx; calyx lasting; pods round, smooth; propagated by seed in common earth.—D. C. Sp. 35.

34. Hairy Madwort (*A. hirsutum*, Bieberstein). A hardy ornamental annual, very like *A. campestre*, about nine inches high, from Tauria and Iberia in 1817: stem upright; leaves lance-shaped, hairy; flowers, from May to July, yellow, in long clusters; pods round, three times the length of the style; propagated by seed in common earth. *Alyssum Draba*, Willdenow.—Delep. Icon. Sel. 2, T. 40. D. C. Sp. 30.

35. Small petalled Madwort (*A. micropetalum*, Fischer).

A hardy uninteresting annual, about six inches to one foot high, from near Tiflis in Iberia, in 1820: stem upright; leaves lance-shaped, slightly hairy; flowers, from May to July, yellow, in long clusters; pods round, hairy, double the length of the style; propagated by seed in common earth. *Alyssum parviflora*, Bieberstein.—Deless. Icon. Sel. 2, T. 39. D. C. Sp. 29.

Var. a. (*A. procumbens*, Bieberstein). Stem widely spread, resting on the ground, and much smaller.

36. Smallest Madwort (*A. minimum*, Willdenow). A hardy uninteresting annual, three to six inches high, from Podolia, Tauria, &c. in 1791; very like the *A. calycinum*, except that the calyx is not lasting; stem spreading; leaves line-like, lance-shaped, hoary; flowers, in July, yellow; pods round, smooth; propagated by seed in sand and peat.—Trall. Thes. Bal. p. 8. T. 35. D. C. Sp. 33.

37. Small Madwort (*A. minutum*, Schlecht). A hardy annual, about one inch high, from rocks in Siberia in 1827: stem rather upright; root-leaves oval, on stalks; stem-leaves oblong-line-like; flowers, in May and June, small, yellow; petals nearly line-like; calyx slightly hairy, fading away slowly; pods round, egg-shaped, smooth; propagated by seed in common earth.—D. C. Sp. 34.

38. Beaked Madwort (*A. rostratum*, Steven). A hardy uninteresting annual, about one foot high, from Bessarabia in European Turkey in 1818: stem upright; leaves lance-shaped, slightly hairy; flowers, in May, June, and July, dark yellow, in long clusters; petals spatula-shaped, double the length of the calyx; pods of a roundish oval form, slightly hairy, grey, scarcely longer than the style; propagated by seed in common earth.—Stev. Mem. Acad. Petersb. III. 295, T. 15, Fig. 1. D. C. Sp. 28.

Var. a. A. vernale, Kitaibel. The leaves line-like, and about one line in breadth.

39. Upright Madwort (*A. strictum*, Willdenow). A hardy annual, three inches high, native of Armenia; differs from *A. densiflorum* in the pods being oval: propagated by seed in common earth.—D. C. Sp. 49.

40. Strigose Madwort (*A. strigosum*, Russel). A hardy annual, three inches high, a native of the country about Aleppo: stem herb-like, covered with starry hairs; leaves inversely egg-oblong, entire; calyx lasting.—D. C. Sp. 52.

41. Umbelled Madwort (*A. umbellatum*, Desvaux). A hardy, ornamental annual, about three inches high, from Tauria in 1821: stem widely spread; leaves line-like, rather hoary; flowers, in June and July, small, sulphur-coloured, in clusters inclined to be umbelled; pods oval, slightly covered with starry hairs; propagated by seed in common earth. *Alyssum brachystachyum*, Bieberstein.—D. C. Sp. 27. [A. C.]

II.

FLOWERS YELLOW; STAMENS NOT TOOTHED; POD RATHER BULGING.—ANODONTEA, *De Candolle.*

42. Thick-podded Madwort (*A. dasycarpum*, Stephan). A hardy ornamental annual, six inches high, from Siberia in 1820: stems erect; leaves oblong, hoary; flowers, in June and July, small, yellow; flower-stalks shorter than the calyx; pods nearly double the length of the style; propagated by seed in common earth. *Vesicaria dasycarpa*, Poiret.—Mag. Berl. 1816. T. II. 14 and 17. D. C. Sp. 38.

43. Toothless Madwort (*A. edentatum*, Waldstein). An uninteresting hardy biennial, one foot high, from Hungary in 1819: stems erect; leaves oblong, velvety, upper ones line-like; flowers, in June and July, yellow; petals two-cleft; calyx spreading; pods egg-shaped, smooth; propagated by seed in common earth. *Vesicaria edentula*, Poiret.—W. and K. Hung. I. T. 92. D. C. Sp. 37.

III.

FLOWERS WHITE; SEEDS USUALLY SOLITARY IN EACH CELL; STAMENS WITHOUT TEETH.—LOBULARIA, *De Candolle.*

44 Sand Madwort (*A. arenarium*, Presl). A procumbent Sicilian shrub: leaves line-lance-shaped, acute, rather hoary; flowers in June and July; pods oval, rather inflated, one-seeded.—Spreng. Syst. Veg. App. p. 239.

45. Canescent Madwort (*A. canescens*, De Candolle). A frame shrub, about four inches high, a native of the rocky mountains in Siberia, Tauria, and Kamtschatka: stem ascendent; leaves oblong-line-like, hoary; flowers, from April to September, white; pods oval, velvety.—D. C. Sp. 45.

Var. a. Shortish (*A. abbreviata*, De Candolle). A variety with short bunchy clusters. *A. montanum* and *A. minutum*, Patrin.

Var. b. Longish (*A. elongata*, De Candolle). A variety with the clusters of flowers longish, and the leaves more hairy. *A. Dauricum*, Schlechtendahl.

46. Halimus-leaved Madwort (*A. halimifolium*, Willdenow). An uninteresting greenhouse under-shrub, six inches high, from Italy, &c. in 1820: stem ascendant; leaves oblong, blunt, clothed with scaly hairs; flowers, from June to September, white; pods round, smooth; propagated by cuttings in common earth. *Lunaria halimifolia*, Allioni.—Bocc. Mus. 45, T. 39. D. C. Sp. 41.

47. Long-fruited Madwort (*A. macrocarpum*, De Candolle). An ornamental greenhouse under-shrub, nine inches high, from the south of France in 1828: stem branched, rather thorny; leaves oblong, blunt, silvery; flowers, from June to September, white; pods rather egg-round, smooth, two seeds in each cell.—Deless. Ic. II. T. 41. D. C. Sp. 43.

48. Pyrenean Madwort (*A. Pyrenaicum*, La Peyrouse). A frame shrub, nine inches high, from rocky districts on the Eastern Pyrenees: stem branched, not thorny; leaves inversely egg-oblong, narrowing at the base, hoary; flowers, from June to August, white; pods oval.—D. C. Sp. 44.

49. Rock Madwort (*A. rupestre*, Tenore). An uninteresting greenhouse under-shrub, six inches high, from rocky places in the south of Italy in 1824: stem rather erect; root-leaves oblong-lance-shaped, acute, silvery; stem-leaves few, line-like; flowers, from May to September, white; pods inversely-egg-shaped; propagated by cuttings in common earth.—Fl. Nap. T. 60. D. C. Sp. 40.

50. Thorny Madwort (*A. spinosum*, Linnæus). A little tufted greenhouse under-shrub, six inches high, from Aragon and the South of France in 1683: old branches and flower-stalks thorny; leaves oblong-line-like, silvery; flowers, from June to August, white; pods round, smooth, two seeds in each cell; propagated by cuttings in sandy loam. *Draba spinosa*, Lamarck.—Barr. Icon. T. 808. D. C. Sp. 42.

51. Slender-leaved Madwort (*A. tenuifolium*, Stephan). A frame shrub, six inches high, from Siberia: stem erect; leaves line-like, acute, clothed with starry down; flowers, white; petals inversely-egg-oblong, blunt, spreading, with thread-like claws; pods oval, hairy.—D. C. Sp. 46.

IV.

FLOWERS WHITE; THE LARGER STAMENS FURNISHED WITH A TOOTH; STEMS HERB-LIKE.—ODONTOSTEMON, *De Candolle.*

52. Northern Madwort (*A. hyperboreum*, Linnæus). A hardy, tufted, frame perennial, two inches high, from rocky places on the western coast of North America: leaves oval, coarsely and acutely toothed, rather hairy; flowers in April and May; petals white, with yellow claws; pods oval. *Draba hyperborea*, Desvaux.—D. C. Sp. 47.

V.

SPECIES NOT SUFFICIENTLY KNOWN.

53. Tooth-leaved Madwort (*A. dentatum*, Nuttal). A hardy perennial, from Virginia: root-leaves rather toothed; stem-leaves line-like, lance-shaped; flowers unknown; pods oval, downy. *Draba arabisans*, Pursh, not Michaux.—D. C. Sp. 51.

54. Doubtful Madwort (*A.? dubium*, Bory de St. Vincent). A hardy shrub, from the rocks of Sierra Nevada in Spain: stems branched; leaves inversely-egg-oblong, lance-shaped, downy; pods egg-shaped, acute, one-seeded. *A. purpureum*, Lagasca. D. C. Sp. 53.

55. Obcordate Madwort (*A. obcordatum*, De Candolle). A plant about six inches high: leaves line-like, lance-shaped, toothed, woolly; pods smooth, roundish inversely-heart-shaped; seeds in each cell; *Aurinia obcordata*, Desvaux.—D. C. Sp. 50. [A. C.]

ALYXIA, R. Brown (from the Greek, ἀλυξις, "anxiety," in allusion to the gloomy aspect of the plants). Gloom Shrub, *Pentandria Monogynia*, Linnæus; *Apocyneæ*, Jussieu. Corolla of one petal, salver-shaped; calyx five-parted; stamens free, shorter than the corolla; stone fruit (*drupa*) with two stones cohering, two-seeded.—Spreng. Syst. Veg. I. 835.

1. Box-leaved Gloom Shrub (*A. buxifolia*, R. Brown). A shrub of New Holland: leaves opposite, inversely-egg-oblong, blunt, ribless; flowers somewhat paired, axillary.

2. Forster's Gloom Shrub (*A. Forsteri*, Cunningham). An evergreen ornamental shrub, five feet high, from Norfolk Island in 1831: flowers white; propagated by cuttings in peat and loam.

3. Blunt-leaved Gloom Shrub (*A. obtusifolia*, R. Brown). A shrub of New Holland and Norfolk Island: leaves in threes, inversely-egg-oblong, blunt; flowers in axillary, stalked umbels.—Spreng. Sp. 3.

4. Dagger-leaved Gloom Shrub (*A. puginiformis*, Cunningham). An evergreen, ornamental, greenhouse shrub, five feet high, from Moreton Bay, in New Holland, in 1830: flowers, in September, white; propagated by cuttings in peat and loam.

5. Ruscus-leaved Gloom Shrub (*A. ruscifolia*, R. Brown). An evergreen, ornamental, greenhouse shrub, from New Holland in 1820: leaves in threes and fours, oval-lance-shaped, veiny, the point thorny; flowers, from April to July, white, axillary, nearly stalkless; propagated by cuttings in sandy peat. *A. Richardsonii*, Sweet.

6. Climbing Gloom Shrub (*A. scandens*, Römer). A shrub of the Society Islands: leaves opposite, egg-oblong, bluntish, shining on both sides, veiny; flower-stalks very short, axillary, three-flowered.

7. Spiked Gloom Shrub (*A. spicata*, R. Brown). A shrub of New Holland: leaves in threes, oval; spikes axillary, stalked; flowers whirled, almost stalkless, furnished with three flower-scales.

8. Starry Gloom Shrub (*A. stellata*, Römer). A shrub of the Friendly and Society Islands: leaves in threes, lance-shaped, bluntish, veiny; flowers in axillary bouquets; flower-stalks shorter than the leaves.

9. Four-cornered Gloom Shrub (*A. tetragona*, R. Brown). A shrub of New Holland: leaves in fours, oblong; leaf-stalk bulging at the base; spikes axillary; flowers in whirls, almost stalkless, furnished with three flower-scales. [A. C.]

ALZATEA, Ruiz (named after De Alzate, a Spanish naturalist). Alzate's Shrub, *Pentandria Monogynia*, Linnæus; *Celastrineæ*, Jussieu. Calyx five-cleft, five angled; persistent petals none; stamens five; style one; capsule inversely heart-shaped, two-celled, two-valved, with a partition in the middle of each valve.—De Cand. Prod. II. 10.

1. Whirled Alzate's Shrub (*A. verticillata*, Ruiz and Pavon). A greenhouse ornamental evergreen shrub, twelve or eighteen feet high, from the groves near the Messapata in Peru in 1824: leaves with a small notch at the tip, inversely-egg-oblong; flowers small, greenish-white, in bunches; propagated by cuttings in sandy peat.—Pers. III., T. 241, f. a. [A. C.]

AMADA, or Amada Ginger. Common names for the *Curcuma Amada*. [A. C.]

AMAJOUA. Aublet (*Amajoa*, Desfontaines), Amajou; *Hexandria Monogynia*, Linnæus; *Rubiaceæ*, Jussieu. Calyx with the limb tubular, six-toothed; corolla salver-shaped; tube longer than the calyx; limb six-parted, spreading; anthers six, line-like; stigma lance-shaped; berry two or three-celled; one seed in each cell.—De Cand. Prod. IV. 369. [A. C.]

1. African Amajou (*A. Africana*, Sprengel). A native of the eastern coast of Africa: leaves opposite, egg-lance-shaped; flowers on axillary, one-flowered stalks(?); berry few-seeded. *Coffea Zanguebariæ*, Loureiro.

2. Brazilian Amajou (*A. Brasiliana*, A. Richard). A creeping Brazilian shrub: leaves oval, taper-pointed; flowers in bunches.

3. Bunchy Amajou (*A. corymbosa*, Humboldt). A tree of New Andalusia: leaves opposite, egg-oblong, ribbed, taper-pointed; flowers in stalked, panicled bunches. *Hexactina corymbosa*.

4. Beech-leaved Amajou (*A. fagifolia*, Desfontaines). A shrub of Cayenne: leaves opposite, inversely-egg-oblong, taper-pointed, nerved; flowers in bunches, on short stalks.

5. Guiana Amajou (*A. Guianensis*, Aublet). A shrub of Guiana: leaves often in threes, broad-lance-shaped, and ribbed; flowers in terminal thick heads. *Hamelia glabra*, Lamarck; *Hamelia sessiflora*, Willdenow; *Duhamelia glabra*, Persoon.

6. Intermediate Amajou (*A. intermedia*, Von Martius). A Brazilian shrub: leaves opposite, oblong, narrowing at both ends, fringed; flowers almost without flower-stalks.

7. Peruvian Amajou (*A.? Peruviana*, Desfontaines). A Peruvian shrub: leaves opposite, oval, ribbed, taper-pointed, shining above; flowers in crowded bunches.

8. Bag-leaved Amajou (*A. saccifera*, Von Martius). A native of Brazil, from Barra to Rio Negro, where it is called *Folho de Comminao*, and *Coa-Jusara*: leaves in threes, inversely-egg-oblong, lance-shaped, double-bag-formed, ribbed; flowers terminal, on short flower-stalks. [A. C.]

AMALAGO; or, Amalago Pepper. A common name for the *Piper Amalago*. [A. C.]

AMALTHEA, Desvaux. A genus arranged under ETÆRIS. [A. C.]

AMANCAES. The specific name of the *Ismene Amancaes*. [A. C.]

AMANEA, Aublet. Spurge Tree. (*Diœcia Pentandria*, Linnæus; *Euphorbiaceæ*, Jussieu). Male flower; calyx five-parted; disk glandular, five-lobed; anthers, by their whole length, united to the filament; female

flower; calyx five-parted; disk glandular, situated below the seed-organ (*ovarium*); stigmas three-lobed?; berry three-celled.—Spreng. Syst. Veg. II. 904.

1. Guiana Spurge Tree (*A. Guianensis*, Aublet). A lofty tree of Guiana, with alternate, oblong, pointed, entire leaves, and with the flowers in spiked heads. [A. c.]

AMANITA, Fries (from the Greek, *αμανιτης*, "a sort of fungus"). Two-veiled Mushroom. (*Cryptogamia Fungi*, Linnæus; *Hymenomycetes Pileati*, Fries). A genus conveniently separated from Agaricus; veil double, universal; wrapper separate from the cap, enveloping the whole of the younger plant; partial veil over the bent back membranous ring; flocks more or less interweaved; stalk becoming somewhat hollow; cap fleshy on the disk, slender at the edge, somewhat warty; gills thinner behind, free, broader before, somewhat unequal.

1. Verdigris Two-veiled Mushroom (*A. æruginosa*, Lamarck). In July and October, in beech woods: cap firm, flat at the top, dusky green; stalk short, firm, ashy green, frequently hollow; gills and juice white. *Agaricus blennius*, Fries.

2. White Two-veiled Mushroom (*A. alba*, Persoon). In the south of Europe, in autumn, in woods: cap thick; stalk thick, velvety outside; one palm high; gills bellying; wrapper loose; poisonous. *Agaricus ovoideus*, Fries.

3. Bitter Two-veiled Mushroom (*A. amara*, Lamarck). In North America, from May to October; cap fleshy, yellow on the disk, edge pale; stalk strong; curtain blackish; gills somewhat green. *Agaricus lateritius*, Fries.

4. Ample Two-veiled Mushroom (*A. ampla*, Persoon). In August and September, on the declivities of hilly ground: cap somewhat velvety, greyish-brown; stalk four to six inches long, thick; ring ample, streaked, somewhat velvety beneath; gills broad; poisonous. *Agaricus excelsus*, Fries.

5. Rough Two-veiled Mushroom (*A. aspera*, Persoon). In July and October, in sunny woods in Britain; cap two inches broad, reddish smoky grey; stalk hardly bulbous, scurfy, two to three inches long; warts minute, dusky white; unwholesome. *Agaricus asper*, Fries.

6. Orange Two-veiled Mushroom (*A. aurantiaca*, Persoon). In autumn, in woods in Britain, and the east and south of Europe: cap orange, hemispherical; stalk somewhat equal, whitish-yellow; wrapper and ring white; unwholesome. *Agaricus cæsareus*, Fries.

7. Eared Two-veiled Mushroom (*A. auricula*, Dubois). In autumn, in grassy places about Orleans: cap rarely exactly round, convex, grey; gills white, running down the stalk; eatable. *Agaricus auricula*, Fries.

8. Hooded Two-veiled Mushroom (*A. calyptrata*, Lamarck). In July and August, near the trunks of the maple and beech: cap three to seven inches broad, somewhat embossed; stalk three to six inches long, smooth; wrapper ample, loose; gills fleshy; eatable. *Agaricus bombycinus*, Fries.

9. Fleshy Two-veiled Mushroom (*A. carnea*, Lamarck). In June and November, in moist ground: cap somewhat fleshy, scaly; disk afterwards depressed; stalk longish, somewhat finely fibrous; gills distinct, distant. *Agaricus laccatus*, Fries.

10. Ashy Two-veiled Mushroom (*A. cinerea*, Lamarck). In June and December, at the roots of trunks: cap persistent, unequal, at length unfolded; stalk firm, thick, zoned within; gills bellying. *Agaricus atramentarius*, Fries.

11. Nail-like Two-veiled Mushroom (*A. clavus*, Bolton). In autumn, on dead trees and on the ground: cap bell-shaped, rather fleshy, smooth; stem solid, hairy, tailed at the bottom; sprout-beds (*thalli*) gregarious, minute; gills broadish white.

12. Ivory Two-veiled Mushroom (*A. eburneus*). In August and November, in leafy woods: cap dried up, shining; stalk afterwards hollow, height somewhat various, wavy in the longish ones; gills distant; eatable. *Agaricus eburneus*, Fries.

13. Eatable Two-veiled Mushroom (*A. edulis*, Lamarck). In May and October: cap fleshy, size various, white, reddish; ring white, curtain-formed; stem firm, rarely scaly; gills approximated. *Agaricus campestris*, Fries.

14. Filamentous Two-veiled Mushroom (*A. filamentosa*, Lamarck). In October and November, near or on the trunks of the willow: cap hemispherical, two to three inches; stem hard, incurved, length various, somewhat bulbous, white; veil ringed; flock radiated; root as if bitten off, somewhat villous; gills very broad, plane. *Agaricus aurivellus*, Fries, 242.

15. Yellowish Two-veiled Mushroom (*A. flavida*, Lamarck). In August and November, near the trunks of the pine: cap blunt, one to two inches and more, never velvety, dusky yellow; stem afterwards hollow, rusty at the base; gills bluntly adnate; curtain afterwards ringed. *Agaricus flavidus*, Fries.

16. Furrowed Two-veiled Mushroom (*A. furcata*, Lamarck). In August and September, in woods: cap green, bent down at the edge, afterwards somewhat funnel-shaped; stem white, rather firm; gills white, furrowed. *Agaricus furcatus*, Fries.

17. Involute Two-veiled Mushroom (*A. involuta*, Lamarck). In autumn, in uncultivated land: cap bell-shaped, naked, with a furrowed edge; stem four to seven inches long, weak; gills white; wrapper sheathing; unwholesome. *Agaricus vaginatus*, Fries.

18. Marble Two-veiled Mushroom (*A. marmorea*, Lamarck). In August and November, in woods: cap three to seven inches broad, with a broad disk and scales; stem eight to twelve inches long, thick, firm, variegated with dark scales; ring swelling at the base, cartilaginous; gills remote; eatable. *Agaricus procerus*, Fries.

19. Soft Two-veiled Mushroom (*A. mollis*, Lamarck). In August and September, in woods: cap deeply umbilicate; stem one inch high, or more, somewhat thickened at the base; gills narrow, yellowish. *Agaricus Chrysoleucus*, Fries.

20. Mossy Two-veiled Mushroom (*A. muscaria*, Persoon). In August and October, in woods in Britain: cap streaked at the base; stem bulbous; warts white, regularly disposed; wrapper scaly. *Agaricus muscarius*, Fries.

21. Shining Two-veiled Mushroom (*A. nitens*, Lamarck). Through the whole summer: cap very blunt, one inch high; stem straight, thick, shining, somewhat bulbous; ringlet distant, white, persistent; gills two to three lines broad. *Agaricus semiovatus*, Fries.

22. Solitary Two-veiled Mushroom (*A. nitida*, Fries). In August and September, in thickets: cap three inches or more, sometimes naked, sometimes with scattered scales; stem firm, equal, half an inch thick; wrapper bulbous; poisonous. *Agaricus solitarius*.

23. Money Two-veiled Mushroom (*A. nummularia*, Lamarck). On putrid leaves: cap convex, afterwards smooth, dry; stem two to three inches long; gills free, narrow. *Agaricus hariolorum*, Fries.

24. Fragrant Two-veiled Mushroom (*A. odora*, Lamarck). In June and October, in woods: cap two to four inches broad, angled at the edge; stem three to six lines thick, one inch or more long, velvety at the base; gills white, afterwards flesh-coloured. *Agaricus Prunulus*, Fries.

25. Dropsical Two-veiled Mushroom (*A. œdematosa*, Lamarck). In autumn, in woods: cap more than an inch; stem two inches long, half an inch thick; gills running down the stalk. *Agaricus œdematopus*, Fries.

26. Pernicious Two-veiled Mushroom (*A. perniciosa*,

Lamarck). In June and October, in sunny places: cap reddish ochry, dry; stem hollow; gills whitish. *Agaricus terminosus*, Fries.

27. Peppery Two-veiled Mushroom (*A. piperita*, Lamarck). In September and October, in woods: cap four to six inches broad, dry, edge bent down; stem one to two inches long, and almost as thick; gills very narrow, line-like, somewhat straight. *Agaricus piperitus*, Fries.

28. Plaited Two-veiled Mushroom (*A. plicata*, Lamarck). In August and November, on the mossy ground in woods: cap half an inch to an inch, never depressed, edge often toothed; stem longish, yellow; gills white. *Agaricus epipterygius*, Fries.

29. Small Two-veiled Mushroom (*A. pusilla*, Persoon). In August, in gardens: cap four lines broad, embossed, pellucid; stem slender, one inch, weak, white; wrapper four to five-parted, silky outside, loose; gills rose-coloured. *Agaricus pusillus*, Fries.

30. Branchy Two-veiled Mushroom (*A. ramosa*, Lamarck). In autumn, near old trunks: cap hemispherical; meshes broad, dry; stem solid, smooth; gills narrow. *Agaricus ramosus*, Fries.

31. Reddish Two-veiled Mushroom (*A. rubescens*, Persoon). In July and September, in woods and fields in Britain: cap three to five inches broad, blunt; stem scaly, somewhat bulbous. *Agaricus rubescens*, Fries.

32. Red Two-veiled Mushroom (*A. rubra*, Lamarck). In July and September, in woods: cap compact, dry, rose-blood-coloured; stem firm, two inches long, often rose-tinted; gills furrowed, white. *Agaricus ruber*, Fries.

33. Ruddy Two-veiled Mushroom (*A. rufescens*, Lamarck). In May and October, about trunks: cap dry, one inch and more, furrowed; stem slender, equal, three inches and more, two lines thick, somewhat smooth; gills pale blackish. *Agaricus micaceus*, Fries.

34. Delicious Two-veiled Mushroom (*A. sanguinea*, Lamarck). In July and November, in pine woods: cap smooth, flat, at first orange, afterwards green, velvety; stem hollow, smooth; gills orange. *Agaricus deliciosus*, Fries.

35. Top-shaped Two-veiled Mushroom (*A. turbinata*, Lamarck). In September and November, in oak woods: cap, at length flat, two to three inches; stem three to four inches long, bulbous, white; gills very entire. *Agaricus turbinatus*, Fries.

36. Spotted Two-veiled Mushroom (*A. umbrina*, Persoon). In August and October, in mountainous woods in Britain: cap two to three inches broad, somewhat velvety, yellow; stem two to three inches long, half an inch thick, firm, white; wrapper not scaly; ring often distant; warts minute, white. *Agaricus pantherinus*, Fries.

37. Poisonous Two-veiled Mushroom (*A. venenata*, Lamarck). In August and October, in woods and groves: cap regular, viscous, firm; stem short, attenuated, white within; gills white. *Agaricus Necator*, Fries.

38. Spring Two-veiled Mushroom (*A. verna*, Persoon). In spring and summer, in woods: cap egg-oblong, somewhat flat, somewhat scaly; stem three to six inches long, four lines thick, torn; gills lance-shaped; wrapper free. *Agaricus vernus*, Fries.

39. Vienna Two-veiled Mushroom (*A. Vindobonensis*, Trattinik). In August and November, on heaps of rubbish: cap three inches broad, dry; stem hollow, firm, three inches long, three to six lines thick, smooth; gills afterwards removed, white, free, broader before. *Agaricus cretaceus*, Fries.

40. Twiggy Two-veiled Mushroom (*A. virgata*, Persoon). In July and August, on ash heaps: cap blunt, pale ash-coloured, three inches broad; stem three to five inches long, half an inch thick, white; wrapper unequally divided, darkish; gills blunt behind. *Agaricus volvaceus*, Fries.

41. Greenish Two-veiled Mushroom (*A. viridula*, Lamarck). In August and November, in woods, fields, &c.: cap convex, afterwards scaly, fleshy, yellow; stem hollow, scaly; gills plane, dark purple. *Agaricus æruginosus*, Fries.

42. Lurid Two-veiled Mushroom (*A. sonaria* Lamarck). In September and October, in grassy places: cap velvety, zoned, lurid, two to three inches broad; stem one inch and a half and more in length, pale, hollow; gills white. *Agaricus luridus*, Fries. [Q. R.]

AMANSIA, Lamouroux (named in honour of the naturalist, St. Amans). St. Amans' Sea Weed. *Cryptogamia Algæ*, Linnæus; *Hydrophytes Dictyoteæ*, Lamouroux. Organisation easily observed with a magnifier of small power; consisting of a net-work of six-sided meshes, regular and longish, with acute summits; fructification not well ascertained; colour reddish-green or olive; height near six inches; duration at least one year.—Lamour.

1. Elegant St. Amans' Sea Weed (*A. elegans*, Lamouroux). An Australian species, similar to *A. semipennata*.

2. Entire St. Amans' Sea Weed (*A. integra*, Lamouroux). An Australian plant, with undivided leaf-plates (*fronds*).

3. Mamilliferous St. Amans' Sea Weed (*A. mamillifera*, Lamouroux). An Australian plant, furnished with teat-like members.

4. Many-cleft St. Amans' Sea Weed (*A. multifida*, Lamouroux). A native of St. Domingo: stem roundish and branchy; branches membranous and toothed on the edges, with many leaf-formed branchlets, more or less toothed and many-cleft.—Lamour. Nov. Bull. Phil. 1809, No. 20, T. 6, figs. *c*, *d*, *e*.

5. Blunt St. Amans' Sea Weed (*A. obtusa*, Lamouroux), A Brazilian plant, with blunt leaves.

6. Winged St. Amans' Sea Weed (*A. semipennata*, Lamouroux). An Australian plant, with a short, roundish, branchy stem; leaf (*frond*) winged or wing-cleft; leafits very small.—Lamour. Ess. Icon. Tab. 5, fig. 4, 5. [E. E.]

AMARACARPUS, Blume (from the Greek, '*αμαρα*, "a furrow," and *καρπος*, "fruit"). Furrow-fruit. *Tetrandria Monogynia*, Linnæus; *Rubiaceæ*, De Candolle. Calyx with an oval tube; limb four-parted; corolla funnel-shaped; stamens four: style one; stigma lobed; fruit a berry, furrowed, one-seeded.—De Cand. Prod. IV. 472.

1. Downy Furrow-fruit (*A. pubescens*, Blume). A small shrub of Java, with opposite, stalked, lance-shaped leaves, and with small axillary, rarely terminal, flowers. [A. C.]

AMARACUS (from the Greek, *α*, "without," and *μαραινω*, "decay," because it keeps its virtues a long time). Moench describes the *Origanum Dictamus*, under the name *Amaracus tomentosus*. [A. C.]

AMARANTACEÆ, R. Brown (from *Amarantus*). A group of dicotyledonous and apetalous plants, in many particulars resembling *Chenopodaceæ*. The leaves are either alternate or opposite, of a soft lax texture, particularly when young; flowers small, sometimes hermaphrodite, sometimes unisexual, disposed in spikes, panicles, or terminal heads; calyx of one leaf, deeply divided into four or five lobes, persistent after fecundation; stamens varying from three to five, hypogynous; filaments in some free and distinct, in others joined and monadelphous; seed-organ (*ovarium*) free, in most with one cell and one seed; in some many-seeded, but rarely two-celled; fruit

a small capsule, opening across or remaining indehiscent; rarely a berry; embryo curving round and nearly albumen. [—. B.]

AMARANTUS. Linnæus (from the Greek *α*, " privative," and *μαραινω*, " I decay," because it does not soon wither). Amaranth or Pasque Flower. *Monœcia Pentandria*, Linnæus; *Pentandria Digynia*, of some authors; *Amaranthaceæ*, Jussieu. Male Flower: calyx three to five-leaved; no corolla; stamens three to five. Female flower: corolla none; styles three; capsules one-celled, cut round about.—Spreng. Syst. Veg. I. 926.

I.

TRIANDRIA: MALE FLOWERS HAVING THREE STAMENS.

1. White Amaranth (*A. albus*, Linnæus). An annual, eighteen inches high, from Pennsylvania in 1778: stem erect, angled; leaves egg-oblong, entire, abruptly blunt; flowers, from July to September, green, in axillary clusters; flower-scales thorny; propagated by seed in common earth.—Wang. Anp. N. Am. Holz. IX. T. 1, b. 2.

2. Narrow-leaved Amaranth (*A. angustifolius*, Bieberstein). An annual, eighteen inches high, from the Levant in 1723: stem branched, erect; leaves lance-shaped, bluntish, sharp-pointed; flowers, from July to September, green, in axillary clusters; calyx and flower-scales pointed; propagated by seed in common earth.

3. Dark purple Amaranth (*A. atropurpureus*, Roxburgh). An ornamental annual, three feet high, from the East Indies in 1820: flowers, from August to November, dark purple; propagated by seed in common earth.

4. Berchtold's Amaranth (*A. Berchtoldii*, Jacquin). An uninteresting annual, two feet high, from the south of Europe in 1825: flowers, in July and August, red; propagated by seed in common earth.

5. Two-coloured Amaranth (*A. bicolor*, Willdenow). An ornamental annual, eighteen inches high, from the East Indies in 1802: leaves egg-oblong, sharp-pointed, coloured; flowers, from July to September, red and yellow, in axillary, stalkless clusters; propagated by seed in rich mould. *A. bicolor*, Nocca.

6. Wild Amaranth, or Wild Blite (*A. Blitum*, Linnæus). A common British trailing annual, not unfrequent on dunghills: stem spreading; leaves egg-oblong, abruptly blunt; flowers, three-leaved, in July and August, green, in half-spiked clusters; calyx blunt; propagated by seed. *A. viridis*, Pollich; *A. oleraceus*, and *A. albus*, Rodschield.—Eng. Bot. 2212.

7. Blistered Amaranth (*A. bullatus*, Besser). An annual, four feet high, introduced in 1822: leaves rather rhomboidal, pointed, blistered, the edge waved; flowers, in July and August, green, in thick, terminal, spiked clusters; calyx rather thorny; propagated by seed in common earth.

8. Field Amaranth (*A. campestris*, Willdenow). An annual, one foot high, from the East Indies in 1818: stem erect, branched; leaves oblong, blunt; flowers, in July and August, green, in simple, few-flowered, whirled heads or clusters; flower-scales and calyx bearded; propagated by seed in common earth.

9. Bending Amaranth (*A. deflexus*, Linnæus). A trailing annual, one foot high, introduced in 1769: leaves rhomboidal, lance-shaped; flowers, in July and August, green, in very simple, few-flowered, naked spikes; fruit not opening of itself; propagated by seed in common earth.—Wang. Anp. N. Amer. Holz. X. T. 10, fig. 20.

10. Banded Amaranth (*A. fasciatus*, Roxburgh). An ornamental annual, two feet high, from the East Indies in 1816: flowers, in July and August; propagated by seed in common earth.

11. Gangetic Amaranth (*A. Gangeticus*, Linnæus). An annual, two feet high, from the East Indies in 1778: leaves egg-oblong, abruptly blunt; flowers, from July to September, green, in short, egg-shaped spikes; calyx pointed; propagated by seed in common soil.—Wang. Anp. N. Amer. XVI. T. 6, fig. 11.

12. Slender Amaranth (*A. gracilis*, Poiret). An annual, one foot high, from Guinea? in 1806: stem erect, simple; leaves rhomboidal egg-oblong, blunt; flowers, in July and August, red, in spike-panicled clusters; propagated by seed in common earth. *Chenopodium caudatum*, Jacq. Icon. II. 344.

13. Greek Amaranth (*A. græcizans*, Linnæus). An annual, eighteen inches high, from Virginia in 1759: stem lying on the ground, smooth; leaves oblong, blunt, entire; flowers, from July to September, green, in axillary, simple clusters; calyx and flower-scales thorny; propagated by seed in common earth.—Wang. Anp. N. Amer. Holz. VIII. T. 4, f. 7.

14. Unpleasant Amaranth (*A. inamœnus*, Willdenow). An annual, two feet high, from Japan? in 1820: leaves egg-oblong, notched at the end; flowers, from June to August, green, in thick spiked clusters; calyx of three leaves, bearded; propagated by seed in common earth. *A. Japonicus*, Houttuyn.—Houtt. Pflan. 72, 1.

15. Mean Amaranth (*A. incomitus*, Willdenow). An annual, about two feet high, introduced in 1823: leaves rhomboidal, egg-oblong; flowers, from June to August, green, in spiked clusters; propagated by seed in common earth.—Willd. Enum. Sup. p. 64.

16. Interrupted Amaranth (*A. interruptus*, R. Brown). An annual, two feet high, frem New Holland in 1818: leaves oblong, bluntish, sharp-pointed; flowers, in July and August, red, in interrupted, many-flowered, spiked clusters; propagated by seed in common earth.

17. Lance-leaved Amaranth (*A. lanceæfolius*, Roxburgh). An ornamental annual, three feet high, from the East Indies in 1816: leaves lance-shaped; flowers, in July and August, red; propagated by seed in common earth.

18. Lined Amaranth (*A. lineatus*, R. Brown). An annual, one foot high, from New Holland in 1823: stem straight, branched; leaves lance-shaped, bluntish, sharp-pointed, lined beneath; flowers, in July and August, green, in axillary and terminal, half-spiked, leafless clusters; calyx blunt; fruit slightly wrinkled; propagated by seed in common earth.

19. Livid Amaranth (*A. lividus*, Linnæus). An annual, five feet high, from Virginia in 1759: stem red; leaves oval, notched at the end, the ribs beneath red; flowers, from July to September, red, in rounded, terminal spiked clusters; calyx of five leaves, bluntish; propagated by seed in common earth. *Blitum lividum*, Mœnch.—Wang. Anp. N. Amer. Holz. XX. T. 1, f. 1.

20. Mangostan Amaranth (*A. Mangostanus*, Linnæus). An annual, two feet high, from Quito in 1801: leaves rhomboidal, roundish, very blunt; flowers, from July to September, green, in many-flowered roundish clusters; calyx scaly; propagated by seed in common earth. *A. Quitensis?* Kunth.—Wang. Anp. N. Amer. Holz. XIII. T. 12.

21. Melancholy Amaranth (*A. melancholicus*, Linnæus). An ornamental annual, eighteen inches high, from the East Indies in 1731: leaves egg-oblong, brass-coloured above, deadly brown beneath; flowers, from June to September, purple, in stalked axillary clusters; calyx pointed like a spear; propagated by seed in rich mould.—Wang. Anp. N. Amer. Holz. 15, T. 9, f. 18.

22. Eatable Amaranth (*A. oleraceus*, Linnæus). An annual, six feet high, from the East Indies in 1764: leaves oblong, blunt, rough; flowers, from June to August, pale red, in terminal and axillary spiked clusters, the spikes branched and interrupted; flower-scales (*bracteæ*) lengthened, pointed; calyx bluntish; propagated by seed in common earth. Used in India as spinach.—Wang. Anp. N. Amer. Holz. 17, T. 5. f. 9.

23. Pale Amaranth (*A. pallidus*, Bieberstein). An annual, one foot high, from the Caucasus in 1817: stem erect, rather branched; leaves egg-oblong, somewhat pointed; flowers, in July and August, pale red, in rather branched, leafy clusters; calyx pointed; propagated by seed in common earth.

24. Persicaria-like Amaranth (*A. persicarioides*, Poiret). An annual, one foot high, from Nepal in 1820: stem erect; leaves egg-oblong, the margin two-jagged, toothed, bending in and out; flowers, in July and August, green, in dense rounded bouquets; calyx pointed; fruit flattish, and crowned with a two-parted style; propagated by seed in common earth.

25. Polygamous Amaranth (*A. polygamus*, Linnæus). An annual, from the East Indies in 1780: stem branched, the branches growing in a straggling manner; leaves oblong, rather pointed, on very long stalks; flowers, from July to September, green, polygamous, in short-clustered spikes; propagated by seed in common earth, used in Guiana and China as spinach.—Rumph. Herb. Amb. V. 82.

26. Polygonum-like Amaranth (*A. polygonoides*, Linnæus). An annual trailing plant, from the East and West Indies in 1778: leaves rhomboidal, egg-oblong, blunt; flowers, in July and August, green, in half-spiked clusters; male flower with three-pointed leaves; female flower funnel-shaped; propagated by seed in common earth. *Roemeria polygonoides*, Mœnch.—Wang. Anp. N. Amer. Holz. II. 16, f. 12,

27. Many-spiked Amaranth (*A. polystachyus*, Willdenow). An annual, about eight inches high, from the East Indies in 1816: leaves egg-lance-shaped, with a notch at the end; flowers, from July to September, green, in slender spikes, the spikes both axillary and terminal; calyx pointed; propagated by seed in common earth.

28. Trailing Amaranth (*A. prostratus*, Balbis). An annual, two feet high, from Italy and France in 1739: stem trailing; leaves egg-oblong, abruptly blunt; flowers, three-leaved, from July to September, green, in rather spiked, branched clusters; calyx pointed; fruit oblong, longer than the calyx; propagated by seed in common earth.

29. Rhomboid-leaved Amaranth (*A. rhomboideus*, Balbis). An annual, of New Holland; leaves rhomboid and egg-oblong, rather abruptly blunt and lined beneath; flowers in slender half-spiked clusters; fruit somewhat wrinkled.

30. Climbing Amaranth (*A. scandens*, Linnæus). A climbing annual, two feet high, from South America in 1796: stem weak; leaves egg-oblong, blunt; flowers, in July and August, green, in spiked clusters, which are rather branched, leafless, and lengthened; calyx pointed; fruit egg-shaped, of the same length as the calyx; propagated by seed in common earth.

31. Spiked Amaranth (*A. spicatus*, Persoon). An annual, three feet high, from the south of Europe: stem erect, rather branched; leaves egg-oblong; flowers, from July to September, green, in terminal-spiked clusters; propagated by seed in common earth.—Pers. Syn. 19.

32. Fine-leaved Amaranth (*A. tenuifolius*, Willdenow). An annual, one foot high, from the East Indies in 1801: stem very branched, spreading; leaves line-like, lance-shaped, abruptly blunt at the end; flowers, from July to September, green, in axillary clusters; calyx and flower-scales (*bracteæ*) blunt; propagated by seed in common earth.

33. Three-coloured Amaranth (*A. tricolor*, Linnæus). An ornamental annual, two feet high, from the East Indies in 1548: leaves egg-oblong, coloured; flowers, from June to September, reddish-yellow, in many-flowered stalkless clusters; calyx pointed like a spear; propagated by seed in rich mould.

34. Sad Amaranth (*A. tristis*, Linnæus). An annual, two feet high, from China and the East Indies in 1759: leaves rather heart-egg-oblong, notched at the end, and with livid spots beneath; flowers, from June to August, purple, in loose spiked clusters; propagated by seed in common earth; used in India as spinach.—Wang. Anp. N. Amer. Holz. XXI. T. 5, f. 10.

35. Wave-leaved Amaranth (*A. undulatus*, R. Brown). An annual, of New Holland: leaves egg-oblong, blunt, waved, of the same length as the leaf-stalks; flowers in half-spiked clusters or heads; calyx bluntish, sharp-pointed; fruit somewhat wrinkled.

36. Green Amaranth (*A. viridis*, Linnæus). An annual, three feet high, from Jamaica and Brazil in 1768: leaves oblong, waved at the margin, notched at the end; flowers, in August and September, green, in seven axillary half-spiked clusters; male flowers three-leaved; calyx blunt; propagated by seed in common earth. *Blitum viride*, Mœnch.—Wang. Anp. N. Amer. Holz. XVIII. T. 8, f. 16.

II.

PENTANDRIA: MALE FLOWERS HAVING FIVE STAMENS.

37. Caraccas Amaranth (*A. Caraccasanus*, Kunth). An ornamental annual, two feet and a half high, from Caraccas in 1818: flowers, in July and August, red; propagated by seed in common earth.

38. Love-lies-bleeding (*A. caudatus*, Linnæus). An ornamental annual, four feet high, from the East Indies in 1596: leaves oblong; flowers, in August and September, red, in thick spiked clusters, the spikes decompound, drooping, red; propagated by seed in common earth.

Var. a. Tree (*A. maximus*). A variety introduced in 1820, growing to about six feet high.

39. Stem-flowering Amaranth (*A. cauliflorus*, Link). An annual, four feet high, from Nepal in 1821: leaves oval, pointed, rather waved, toothed; flowers, from June to September, green, in axillary, bouquet-like clusters; propagated by seed in common earth.

40. Celosia-like Amaranth (*A. celosioides*, Kunth). An ornamental annual, two feet high, from South America in 1818: flowers, in July and August, red; propagated by seed in common earth.

41. Green-spiked Amaranth (*A. chlorostachys*, Willdenow). An annual, three feet high, introduced in 1796: leaves lance-shaped; flowers green, in compound, nodding clusters; propagated by seed in common earth.—Wang. Anp. N. Amer. Holz. XXXIV. T. 10, f. 19.

42. Blood-spiked Amaranth (*A. cruentus*, Linnæus). An ornamental annual, three feet high, from China in 1728: leaves oblong, the ribs beneath purple; flowers, from June to August, dark red, in thick, compound, spreading, blood-coloured spikes or clusters; propagated by seed in rich mould.

43. Curve-leaved Amaranth (*A. curvifolius*, Sprengel). An annual, one foot and a half high, from France in 1824: branches thickly and closely hairy; leaves oblong-lance-shaped, spear-pointed, wavy, notched, convex, on very long downy stalks; flowers, in July and August, red, in axillary and terminal panicled-spiked clusters; flower-scales and calyx bearded; propagated by seed in common earth.

44. Yellow Amaranth (*A. flavus*, Linnæus). An ornamental annual, four feet high, from the East Indies in 1759: leaves oblong-lance-shaped; flowers, from July to September, light yellow, in compound, nodding clusters; propagated by seed in common earth..

45. Frumentaceous Amaranth (*A. frumentaceus*, Roxburgh). An ornamental annual, two and a half feet high, from the East Indies in 1823: flowers, in August and September, red; propagated by seed in common earth.

46. Giant Amaranth (*A. giganteus*, Dietrich). An uninteresting annual, four feet high, introduced in 1817: flowers, in July and August, red; propagated by seed in common earth.

47. Hectic Amaranth (*A. hecticus*, Willdenow). An

ornamental annual, three feet high, introduced in 1596: leaves egg-oblong, acute; flowers, in August and September, red, in axillary, simple, spiked clusters; propagated by seed in common earth.

48. Hybrid Amaranth (*A. hybridus*, Linnæus). An annual, four feet high, from Virginia in 1656: leaves egg-lance-shaped; flowers, from June to September, green, in erect decompound clustered branches; calyx awl-shaped; propagated by seed in common earth. *A. hecticus*, β, Willdenow; *A. retroflexus*, Lamarck.

49. Prince's Feather (*A. hypochondriacus*, Linnæus). An ornamental annual, five feet high, from Virginia in 1684: leaves oblong, notched at the end, rusty-coloured beneath; flowers, from July to September, dark red, in erect, thick compound clusters; calyx sharp-pointed; propagated by seed in common earth.—Spreng. Sp. 40.

50. Joyful Amaranth (*A. lætus*, Willdenow). An annual, two feet high, from Italy in 1799: stem erect, smooth; leaves oblong, bluntish, notched at the end; flowers, from July to September, red, in compound, erect, terminal clusters; flower-scales bristle-like; calyx pointed; propagated by seed in common earth.—Wang. Anp. N. Amer. Holz. XXVIII. T, 8. f. 15.

51. Panicled Amaranth (*A. paniculatus*, Linnæus). An ornamental annual, six feet high, from North America in 1798: branches spreading, downy; leaves egg-lance-shaped, on very long stalks; flowers, from July to September, green, in extra decompound clusters; propagated by seed in common earth.

52. Parisian Amaranth (*A. Parisiensis*, Schkuhr). An annual, one foot high, from France in 1817: flowers, in July and August, green; propagated by seed in common earth.

53. Dwarf Amaranth (*A. pumilus*, Nuttal). An annual, four inches high, from North America in 1824: stem erect, dwarf; leaves roundish, very blunt, rather fleshy, stalked; flowers, in July and August, in axillary, simple spikes, or clusters; calyx blunt; fruit oblong; propagated by seed in common soil.

54. Bent-back Amaranth (*A. retroflexus*, Linnæus). An annual, two feet high, from Italy and North America in 1759: branches hairy, the hairs bent back (*retroflexus*); leaves oblong, waved; flowers, from July to September, green; spikes thick, very branched; calyx like the point of a spear; propagated by seed in common earth.—Wang. Anp. N. Amer. Holz. XXXIII. T. 11, f. 21.

55. Rigid Amaranth (*A. rigidus*, Schultz). An annual, one foot high, introduced in 1817: flowers, in July and August, green; propagated by seed in common earth.

56. Bloody Amaranth (*A. sanguineus*, Linnæus). An ornamental annual, three feet high, from the East Indies in 1775: branches spreading, smooth; leaves oblong, reddish beneath; flowers, from July to September, red, in interrupted spiked heads or clusters; spikes compound and lengthened; propagated by seed in common earth.—Wang. Anp. N. Amer. Holz. XXXI, T. 2, f. 3.

57. Showy Amaranth (*A. speciosus*, Ker). An ornamental annual, six feet high, from Nepal in 1819: stem erect, branched; leaves egg-oblong, red beneath; flowers, in July and August, red, in thick, spiked, somewhat whirled clusters; the spikes decompound, erect, coloured; propagated by seed in common earth.—Bot. Mag. 2227.

58. Showy Caucasian Amaranth (*A. speciosus*, Bieberstein). An annual, eighteen inches high, from Caucasus in 1818: flowers, in July and August, red; propagated by seed in common earth.

59. Thorny Amaranth (*A. spinosus*, Linnæus). An annual, two feet high, from the East Indies in 1683: stem erect, with axillary thorns; flowers, from July to September, green, in thick, interrupted terminal clusters; flower-scales and calyx sharp-pointed; propagated by seed in common earth.—Wang. Anp. N. Amer. Holz. 38, T. 4, 8.

60. Upright Amaranth (*A. strictus*, Willdenow). An annual, two feet high, from Italy in 1793: leaves oblong, sharp-pointed, downy beneath; leaf-stalk downy; flowers, from July to September, green, in thick, upright, compound, spiked cluster; flower-scales (*bracteæ*) and calyx shaped like the point of a spear; propagated by seed in common earth.—Wang. Anp. N. Amer. Hloz. 27, T. 3, 5.

61. Wood Amaranth (*A. sylvestris*, Desfontaines). An annual, one foot high, from the Pyrenees in 1819: flowers, in July and August, green; propagated by seed in common earth.

62. Zano Amaranth (*A. Zanensis*, Hornemann). An annual, two feet high, introduced in 1822: flowers, in July and August, red; propagated by seed in common earth.

AMARELLA (from *amarus*, "bitter"). The *Gentiana Amarella*. [A. C.]

AMARIA, Sebastiani. Sebastiani's Shrub. *Monadelphia Decandria*, Linnæus; *Leguminosæ*, Jussieu. Calyx cylindrical, rounded at the base, permanent, five-cleft; lobes line-like, cohering at the tip; petals five, equal, inversely-egg-oblong, spreading from the base to the tip; stamens awl-shaped, erect; seed-organ oblong, having a short stalk; style thread-shaped, crowned by a headed stigma; pod very long, one-celled, two-valved, gaping when ripe; seeds many, as if pressed together, roundish; leaves simple, heart-shaped.—De Cand. Prod. II., p. 519.

1. Stalked-leaved Sebastiani's Shrub (*A. petiolata*, Sebastiani). A stove shrub, four to six feet high, from New Granada: leaves stalked; flowers terminal; propagated by cuttings in loam, peat, and sand.

2. Stalkless-leaved Sebastiani's Shrub (*A. sessilifolia*, Sebastiani). A stove shrub, four to six feet high, from New Granada: leaves without leaf-stalks, almost stem-clasping; flowers on axillary, many-flowered foot-stalks; propagated by cuttings in loam, peat and sand. [A. C.]

AMARYLLIDEÆ, R. Brown (from *Amaryllis*). A group of monocotyledonous plants, separated from the *Narcissæ* of Jussieu, and differing from the *Hermerocallideæ* of R. Brown, in the seed-organ (*ovarium*) being inferior; calyx tubular, of one leaf with six divisions; stamens six, the filaments free or united; the seed-organ (*ovarium*) three-celled; style simple, the summit three lobed; fruit, a capsule somewhat celled (*loculicidus*), three-valved, many seeded, or a berry with three seeds; root bulbiferous or fibrous; flowers usually large and showy, disposed in umbels. [B. E.]

AMARYLLIS, Linnæus (named after a nymph celebrated especially by Virgil). Amaryllis. *Hexandria Monogynia*, Linnæus. *Amaryllideæ*, Jussieu. Perianth superior, coloured, with the orifice naked; flower nodding, irregular, funnel-shaped, gaping; filaments curved downwards, unequal in proportion or direction; stigma three-lobed; seeds flat, numerous; ornamental, bulbous-rooted plants.—Spreng. Syst. Veg. II. 49.

I.

DISTINCT SPECIES: ORNAMENTAL BULBOUS-ROOTED PERENNIALS.

1. Streak-flowered Amaryllis (*A. advena*, Bot. Reg.) A stove perennial, nine inches high, from Chili in 1807: leaves one or more, line-like, strap-shaped, sea-green; flower-stalk many flowered; flowers, in May and June, scarlet; tube fringed; propagated by offsets in rich mould.—Bot. Reg. 1125, 1.

Var. a. Wax-coloured (*A. cerina*, Lindley). A stove perennial, nine inches high, from Chili in 1821: flowers, in May and June, purplish yellow; propagated by offsets in rich mould. Bot. Reg. 1125, 2.

2. Courtly Amaryllis (*A. aulica*, Bot. Reg.) A stove perennial, eighteen inches high, from Brazil in 1800: leaves lance-shaped; flowers, from May to August, greenish scarlet on erect stalks; tube crowned by a short, entire, green membrane; propagated by offsets in rich mould. Bot. Reg. 444.

Var. a. Broad petaled (*A. platypetala*, Bot. Reg.) A stove perennial, eighteen inches high, from Brazil in 1824: flowers, from May to August, orange; petals broader; propagated by offsets in rich mould.—Bot. Reg. 1030.

3. Belladonna Lily (*A. Belladonna*, Linnæus). A perennial, two feet high, from the West Indies in 1712: leaves strap-shaped; flowers, from July to September, blush-red, on stalks; corolla regular, top-shaped, nodding; scarcely any tube; propagated by offsets in peaty loam.—Bot. Mag. 733.

Var. a. Pale-flowered (*A. pallida*). A perennial of Madeira, two feet high; flowers pale-coloured, from July to September; propagated by offsets in peaty loam.—Red. Lil. 470.

4. Charming Amaryllis (*A. blanda*, Ker). A greenhouse perennial, eighteen inches high, from the Cape of Good Hope in 1754: leaves many, oblong, blunt; flowers, in May and June, pink, on straggling stalks; tube strait, top-shaped; limb bent back, spreading; propagated by offsets in rich mould.—Bot. Mag. 1450.

5. Green-flowered Amaryllis (*A. calyptrata*, Bot. Reg.) A stove perennial, eighteen inches high, from Brazil in 1816: leaves broad, lance-shaped, strap-shaped, longer than the flower-stalk; flowers, from May to August, green; limb, half-gaping, nodding, the outer segments bent inwards; propagated by offsets in rich mould.—Bot. Reg. 164.

6. Saffron-coloured Amaryllis (*A. crocata*, Bot. Reg.) A stove perennial, one foot high, from Brazil in 1815: leaves oblong, blunt; flower-stalk rounded, smooth, longer than the leaves; flowers, in April and May, vermilion, on erect stalks; corolla drooping, unequal; propagated by offsets in rich mould.—Bot. Reg. 38.

Var. a. Queen's Lily (*A. regina*, Hortorum). A stove hybrid perennial, one foot high, cultivated in 1810: flowers, in May and June, scarlet; propagated by offsets in rich mould.

7. Equestrian Amaryllis (*A. equestris*. Jacquin). A stove perennial, one foot high, from the West Indies in 1710: leaves broad, lance-shaped; flower-stalk smooth; flowers, from July to October, scarlet, on erect stalks shorter than the flower-stalk; tube horizontal, fringed; limb curved inwards; propagated by offsets in rich mould. *Barbadoes Lily.*—Bot. Mag. 305.

Var. a. Larger (*A. major*). A stove perennial, eighteen inches high, from the West Indies in 1710: flowers, from July to October, scarlet; propagated by offsets in rich mould. —Bot. Reg. 234.

Var. b. Double (*A. plena*). A stove perennial, eighteen inches high, from the West Indies in 1809: flowers, from May to September, scarlet, double; propagated by offsets in rich mould.

8. Flame Amaryllis (*A. flammea*, Ruiz and Pavon). A stove perennial, one foot high, from Peru in 1825: leaves line-like, acute; flowers, in April flame yellow; corolla bell-shaped, with the segments rather rolled together; tube short; stamens erect, short; propagated by offsets in rich mould. Fl. Pers. 3, 286, 6.

9. Forbes's Amaryllis (*A. Forbesii*, Lindley). A splendid greenhouse perennial, eighteen inches high, from the Cape of Good Hope in 1823; flowers, in July and August, pinkish white; propagated by offsets in sandy loam.

Var. a. Purple (*A. purpurea*, Lindley). A splendid greenhouse perennial, eighteen inches high, from the Cape of Good Hope in 1823: flowers, in July and August, purple; propagated by offsets in sandy loam.

10. Jacobea Lily (*A. formisissima*, Linnæus). A greenhouse perennial, nine inches high, from North America in 1658: leaves rather line-like, channelled, longish; flowers, from May to August, dark red; corolla nodding, with a very gaping limb; tube fringed; propagated by offsets in rich mould. *Sprengelia formisissima*, Herbert.—Bot. Mag. 47.

11. Stripe-tubed Amaryllis (*A. fulgida*, Bot. Reg.) A stove perennial, one foot high, from Brazil: leaves oblong, lance-shaped; flowers, in April and May, vermilion red, nodding, with an oblique mouth; tube striped; propagated by offsets in rich mould.—Bot. Reg. 226.

Var. a. Banded (*A. vittata*, Hornemann). A stove hybrid perennial, six inches high, cultivated in 1820: flowers, in April and May, violet; propagated by offsets in rich mould.

12. Hyacinth Amaryllis (*A. hyacinthina*, Bot. Reg.) A stove perennial, one foot high, from South America in 1814: leaves egg-oblong; flower-stalk rounded; flowers, in June and September, blue on naked stalks; tube rather short; segments lance-shaped, gaping, the lower ones waved; stamens straggling; propagated by offsets in rich mould. *Griffinia hyacinthina*, Herbert.—Bot. Reg. 163.

13. Intermediate Amaryllis (*A. intermedia*, Lindley). A stove perennial, eighteen inches high, from Brazil in 1821: flowers in May and June, stripod; propagated by offsets in rich mould.

14. Lined Amaryllis (*A. lineata*, Colladon). A greenhouse perennial, nine inches high, from South America in 1820: sheath (*spatha*) many-flowered; flowers, from April to August, reddish white, on stalks; propagated by offsets in rich mould. *A vittata, var. b. Harrisoni.*—Bot. Reg. Coll. Hort. Riss. 3.

15. Maranhâo Amaryllis (*A. Marinensis*, Bot. Reg.) A stove perennial, one foot high, from Maranhâo in 1821: leaves broad, lance-shaped, shining; flowers, in May and June, red, gaping, on erect stalks; tube nodding, fringed; throat naked; propagated by offsets in rich mould. *A. stylosum et Hippeastrum stylosum*, Bot. Mag.—Bot. Reg. 719.

16. Vermilion Amaryllis (*A. miniata*, Ruiz and Pavon). A stove perennial, one foot high, from Peru in 1825: leaves strap-shaped, smooth; flower-stalk smooth; flowers, in June and July, flesh-coloured, gaping, drooping; tube very short, fringed; stamens curved downwards; propagated by offsets in rich mould.

17. Ribbed Amaryllis (*A. nervosa*, Humboldt). A stove perennial, one foot high, from Mexico in 1825: leaves very narrow, line-like, sheath lance-shaped, longish; flowers, in May, red; corolla, bell-shaped, with long, acute, ribbed, equal segments; propagated by offsets in rich mould.

18. Pale Amaryllis (*A. pallida*, Herbert). A perennial one foot high, from the Cape of Good Hope; flowers, in July and August, pale red; propagated by offsets in rich mould.—Bot. Reg. 714.

19. Prince's Amaryllis (*A. Principis*, Salm). A stove perennial, one foot high, from Brazil in 1823: leaves oblong, blunt, narrowing at the base, purplish beneath, much shorter than the flower-stalk; sheath usually three flowered; flowers, in June and July, scarlet; propagated by offsets in rich mould.

20. Parrot Amaryllis (*A. psittacina*, Bot. Reg.) A stove perennial, eighteen inches high, from Brazil in 1816: leaves lance-shaped, smooth; flower-stalk smooth; flowers, two, from May to August, greenish scarlet, gaping, and erect stalks; membrane of the tube very short, two-coloured, tooth-letted; stamens not projecting; propagated by offsets in rich mould. —Bot. Reg. 199.

21. Modest Amaryllis (*A. pudica*, Ker). A greenhouse perennial, three inches high, from the Cape of Good Hope in 1795: one-flowered; flowers, from May to July, pink; corolla regular, erect, top-shaped, approaching; one piece of the calyx pushed aside by the stamens; propagated by offsets in rich mould.—Ker. Rec. Pl. 88.

22. Powdery Amaryllis (*A. pulverulenta*, Herbert). A stove perennial, one foot high, from Brazil in 1819: leaves long, strap-shaped, flower-stalk rounded, very grey; flowers, in April and May, red, with taper-pointed segments, propagated by offsets in rich mould.—*A. acuminata*, Bot. Reg. *Hippeastrum pulverulentum*, Bot. Mag.—Bot. Reg. 534.

Var. a. Long-stalked (*A. longipedunculata*, Lindley). A greenhouse perennial, two feet high, from Mexico in 1826: flowers, in March and April, orange, on long flower-stalks; propagated by offsets in rich mould.—Bot. Reg. 1188.

23. Dwarf Amaryllis (*A. pumilio*, De Spin.) A greenhouse perennial, six inches high, from the Cape of Good Hope in 1774: leaf line-like, channelled; sheath two-cleft, acute, longer than the tube of the corolla: flowers, in November, pink; stamens not projecting; propagated by offsets in rich mould.

24. Queen's Amaryllis (*A. regina*, Linnæus). A stove perennial, two feet high, from America in 1725: leaves few, strap-shaped, taper-pointed, with a keeled rib; flowers, in May and June, scarlet; corolla top-shaped, nodding; tube short, thick, fringed; propagated by offsets in rich mould.—Bot. Reg. 453.

Var. a. Powdery (*A. pulverulenta*, Loddiges). A stove hybrid perennial, eighteen inches high, cultivated in 1820: flowers, in May and June, scarlet; propagated by offsets in rich mould.

Var. b. Banded (*A. vittata*, Hort. Trans.) A stove hybrid perennial, eighteen inches high, cultivated in 1820: flowers, in May and June, scarlet; propagated by offsets in rich mould.—Hort. Trans. V. 15.

25. Nettled Amaryllis (*A. reticulata*, Hort. Kew.) A stove perennial, one foot high, from Brazil in 1777: leaves several, strap-oblong, narrowing towards the base; flowers, in April and May, purple, drooping, hooded, tubular, propagated by offsets in rich mould.—Bot. Reg. 657.

26. Net-ribbed Amaryllis (*A. retinervia*, Sweet). A stove perennial, eighteen inches high, from the West Indies in 1822: flowers, from April to June, scarlet; propagated by offsets in rich mould.

27. Flame-red Amaryllis (*A. rutila*, Bot. Reg.) A stove perennial, nine inches high, from Brazil in 1815: leaves lance-shaped; flower-stalk smooth; flower-stalks erect; flowers, in April and May, scarlet; limb of the corolla two-lipped, lower segment narrow; propagated by offsets in rich mould.—Bot. Reg. 23.

28. Solandra-flowered Amaryllis (*A. solandræflora*, Lindley). A stove perennial, eighteen inches high, from Cayenne in 1820: leaves lance-shaped, bluntish; flower-stalk erect, longer than the leaves; flowers, about two, in April, purplish yellow; tube very long; limb smooth, striped within; propagated by offsets in rich mould.—Lind. Coll. 11.

Var. a. Red-streaked (*A. rubro-striata*). The flowers reddish white, streaked.

Var. b. Purplish (*A. purpurascens*). The flowers purplish white.—Bot. Mag. 2573.

29. Streaked-leaved Amaryllis (*A. striatifolia*, Sweet). A stove perennial, one foot high, from Brazil in 1815: flowers, in April and May, purple; propagated by offsets in rich mould.—*A. reticulata, var. β striatifolia.* Encycl. Pl. No. 4247.

30. Bearded Amaryllis (*A. subbarbata*, Bot. Mag.) A stove perennial, one foot high, from Brazil in 1823; flowers, in all seasons, scarlet; propagated by offsets in rich mould.—Bot. Mag. 247.

31. Tartarian Amaryllis (*A. Tartarica*, Pallas). A stove perennial, six inches high, from Tartary in 1822: leaves line-like, very narrow; sheath two-flowered; flowers, in May, blue, on long flower-stalks; corolla bell-shaped, deeply six-parted, upper segment very narrow; propagated by offsets in rich mould.

32. Banded Amaryllis (*A. vittata*, Hort. Kew.) A greenhouse perennial, one foot high, from the Cape of Good Hope in 1769: leaves thong-shaped, shorter than the flower-stalk; flowers, in April and May, striped; corolla bill-shaped; propagated by offsets in rich mould.—Bot. Mag. 129.

Var. a. Large (*A. major*, Lindley). A greenhouse perennial, two feet high, from the Cape of Good Hope in 1774; flowers, from May to July, striped; propagated by offsets in rich mould.—Bot. Mag. 1430.

33. Filletted Amaryllis (*A. vittata*, Lindley). A greenhouse perennial, two feet high, from South America in 1819: flowers, in July and August, variegated; propagated by offsets in rich mould.—Bot. Reg. 876.

II.

HYBRID, OR MULE SPECIES: ORNAMENTAL BULBOUS-ROOTED PERENNIALS.

34. Approaching Amaryllis (*A. accedens*, Sweet). A stove perennial, eighteen inches high, cultivated in 1821: flowers, at all seasons, dark purple; propagated by offsets in rich mould.

35. Lovely Amaryllis (*A. amabilis*, Sweet). A greenhouse perennial, eighteen inches high, produced in 1822; flowers, from June to October, variegated; propagated by offsets in rich mould.

36. Pleasing Amaryllis (*A. amœna*, Sweet). A stove perennial, one foot high, cultivated in 1821: flowers, at all seasons, red; propagated by offsets in rich mould.

37. Anderson's Amaryllis (*A. Andersoni*, Sweet). A greenhouse perennial, one foot high, cultivated in 1821: flowers, in June and July, red; propagated by offsets in rich mould.

38. Annesley's Amaryllis (*A. Annesleyanæ*, Sweet). A stove perennial, one foot high, cultivated in 1823; flowers, from May to July, purple; propagated by offsets in rich mould.

39. Dark-red Amaryllis (*A. atrorubens*, Sweet). A stove perennial, eighteen inches high, cultivated in 1821; flowers, in May and June, red; propagated by offsets in rich mould.

40. Attenuated Amaryllis (*A. attenuata*, Sweet). A stove perennial, one foot high, cultivated in 1822: flowers, in all seasons, pale red; propagated by offsets in rich mould.

41. August Amaryllis (*A. augusta*, Sweet). A stove perennial, two feet high, produced in 1822; flowers, from June to October, scarlet; propagated by offsets in rich mould.

42. Leaf-scaled Amaryllis (*A. bracteata*, Sweet). A stove perennial, one foot high, cultivated in 1821: flowers, at all seasons, red; propagated by offsets in rich mould.

43. Short-flowered Amaryllis (*A. breviflora*, Sweet). A greenhouse perennial, one foot high, produced in 1822: flowers, from June to October, red; propagated by offsets in rich mould.

44. Short-leaved Amaryllis (*A. brevifolia*, Sweet). A stove perennial, two feet high, cultivated in 1821: flowers, in April and May, red; propagated by offsets in rich mould.

45. Bell-flowered Amaryllis (*A. campanulata*, Sweet). A stove perennial, eighteen inches high, produced in 1822; flowers, from June to October; purple scarlet; propagated by offsets in rich mould.

46. Channelled Amaryllis (*A. canaliculata*, Sweet). A stove perennial, eighteen inches high, produced in 1822: flowers, from June to October, scarlet: propagated by offsets in rich mould.

47. Carnescent Amaryllis (*A. carnescens*, Sweet). A stove perennial, one foot high, cultivated in 1821: flowers, in all seasons, purplish white; propagated by offsets in rich mould.

48. Scarlet Amaryllis (*A. coccinea*, Sweet). A stove perennial, two feet high, cultivated in 1821; flowers, at all seasons, scarlet; propagated by offsets in rich mould.

49. Colvill's Amaryllis (*A. Colvilli*, Sweet). A stove perennial, eighteen inches high, cultivated in 1821: flowers, in June and July, reddish purple; propagated by offsets in rich mould.

Compact Amaryllis (*A. compacta*, Sweet). A stove perennial, one foot high, cultivated in 1821: flowers, in all seasons, red; propagated by offsets in rich mould.

51. Kin Amaryllis (*A. consanguinea*, Sweet). A stove perennial, one foot high, cultivated in 1821: flowers, in all seasons, orange; propagated by offsets in rich mould.

52. Cousin Amaryllis (*A. consobrina*, Sweet). A stove perennial, one foot high, cultivated in 1823: flowers, from May to June, pink or rose; propagated by offsets in rich mould.

53. Ribbed Amaryllis (*A. costata*, Sweet). A stove perennial, one foot high, cultivated in 1821: flowers, at all seasons, striped; propagated by offsets in rich mould.

54. Curled-flowered Amaryllis (*A. crispaflora*, Sweet). A greenhouse perennial, two feet high, produced in 1822: flowers, from May to July, scarlet, curled; propagated by offsets in rich mould.

55. Copper Amaryllis (*A. cuprea*, Sweet). A stove perennial, one foot high, cultivated in 1822; flowers, in all seasons, copper-coloured; propagated by offsets in rich mould.

56. Comely Amaryllis (*A. decora*, Sweet). A stove perennial, eighteen inches high, cultivated in 1821: flowers, from May to August, striped; propagated by offsets in rich mould.

57. Delightful Amaryllis (*A. delecta*, Sweet). A greenhouse perennial, nine inches high, produced in 1822; flowers, from June to October, dark red; propagated by offsets in rich mould.

58. Dioecious Amaryllis (*A. dioica*, Sweet). A stove perennial, one foot high, cultivated in 1821; flowers, in all seasons, reddish purple; propagated by offsets in rich mould.

59. Two-coloured Amaryllis (*A. discolor*, Sweet). A stove perennial, one foot high, cultivated in 1821; flowers, at all seasons, striped; propagated by offsets in rich mould.

60. Expanded Amaryllis (*A. expansa*, Sweet). A stove perennial, one foot high, cultivated in 1821; flowers, at all seasons, dark red; propagated by offsets in rich mould.

61. Tawny Amaryllis (*A. fulva*, Sweet). A greenhouse perennial, one foot high, produced in 1822; flowers, from June to October, brown or tawny; propagated by offsets in rich mould.

62. Glaucescent Amaryllis (*A. glaucescens*, Sweet). A greenhouse perennial, eighteen inches high, produced in 1822; flowers, from June to October, red; propagated by offsets in rich mould.

63. Large-flowered Amaryllis (*A. grandiflora*, Sweet). A stove perennial, two feet high, cultivated in 1821; flowers in May and June, striped; propagated by offsets in rich mould.

64. Four-coloured Amaryllis (*A. quadricolor*, Sweet). A stove perennial, eighteen inches high, produced in 1822; flowers, from June to October, striped; propagated by offsets in rich mould.

65. Hood's Amaryllis (*A. Hoodsii*, Sweet.) A greenhouse perennial, one foot high, produced in 1822; flowers, from June to October, scarlet white; propagated by offsets in rich mould.

66. Ignescent Amaryllis (*A. ignescens*, Sweet). A greenhouse perennial, eighteen inches high, produced in 1822; flowers, from May to July, ignescent or flame-coloured; propagated by offsets in rich mould.

67. Imbued Amaryllis (*A. imbuta*, Sweet). A stove perennial, two feet high, cultivated in 1821: flowers, in all seasons, red; propagated by offsets in rich mould.

68. Imperial Amaryllis (*A. imperialis*, Sweet). A greenhouse perennial, eighteen inches high, produced in 1822: flowers, from June to September, scarlet; propagated by offsets in rich mould.

69. Johnson's Amaryllis (*A. Johnsoni*, Sweet). A greenhouse perennial, two feet high, cultivated in 1810: flowers, in May and June, striped; propagated by offsets in rich mould. *A. spectabilis*, Loddiges.

70. Brick-red Amaryllis (*A. lateritia*, Sweet). A greenhouse perennial, eighteen inches high, produced in 1822: flowers, from June to October, brick-coloured; propagated by offsets in rich mould.

71. Long-flowered Amaryllis (*A. macrantha*, Sweet). A greenhouse perennial, eighteen inches high, produced in 1822: flowers, from June to October, red; propagated by offsets in rich mould.

72. Many-striped Amaryllis (*A. multistriata*, Sweet). A stove perennial, eighteen inches high, produced in 1832: flowers, from June to October, many-striped; propagated by offsets in rich mould.

73. Changeable Amaryllis (*A. mutabilis*, Sweet). A stove perennial, one foot high, cultivated in 1822: flowers, in all seasons, variegated; propagated by offsets in rich mould.

74. Rib-leaved Amaryllis (*A. nervifolia*, Sweet). A stove perennial, nine inches high, cultivated in 1821: flowers, at all seasons, pale red; propagated by offsets in rich mould.

75. Obscure Amaryllis (*A. obscura*, Sweet). A stove perennial, one foot high, cultivated in 1821: flowers, in May and June, striped; propagated by offsets in rich mould.

76. Pallescent Amaryllis, (*A. pallescens*, Sweet). A stove perennial, one foot high, cultivated in 1821: flowers, in all seasons, pale red; propagated by offsets in rich mould.

77. Sweet's Pale Amaryllis (*A. pallida*, Sweet). A greenhouse perennial, one foot high, cultivated in 1821: flowers, in June and July, pale orange; propagated by offsets in rich mould.

78. Cloak-flowered Amaryllis (*A. palliiflora*, Sweet). A stove perennial, two feet high, cultivated in 1821: flowers, in all seasons, reddish-white; propagated by offsets in rich mould.

79. Spreading Amaryllis, (*A. patens*, Sweet). A stove perennial, two feet high, cultivated in 1821: flowers, at all seasons, purple; propagated by offsets in rich mould.

80. Very-spreading Amaryllis (*A. patentissima*, Sweet). A stove perennial, eighteen inches high, cultivated in 1821: flowers, in August and September, crimson; propagated by offsets in rich mould.

81. Purple Amaryllis (*A. phœnicea*, Sweet). A stove perennial, eighteen inches high, cultivated in 1821: flowers, from May to July, purple; propagated by offsets in rich mould.

82. Princely Amaryllis (*A. princeps*, Sweet). A greenhouse perennial, one foot high, produced in 1822: flowers, from June to October, scarlet; propagated by offsets in rich mould.

83. Fair Amaryllis (*A. pulchra*, Sweet). A greenhouse perennial, nine inches high, cultivated in 1823: flowers, from April to August, purplish white; propagated by offsets in rich mould.

84. Dotted Amaryllis (*A. punctata*, Sweet). A stove perennial, one foot high, cultivated in 1822: flowers, in all seasons, pale rod; propagated by offsets in rich mould.

85. Purpurascent Amaryllis (*A. purpurascens*, Sweet). A stove perennial, eighteen inches high, cultivated in 1821: flowers, at all seasons, purple; propagated by offsets in rich mould.

86. Recurved Amaryllis (*A. recurvata*, Sweet). A stove perennial, one foot high, cultivated in 1821: flowers, from April to June, striped; propagated by offsets in common earth.

87. Recurved-flowered Amaryllis (*A. recurviflora*, Sweet). A stove perennial, nine inches high, produced in 1822: flowers, from June to October, red, recurved; propagated by offsets in rich mould.

88. Net-flowered Amaryllis (*A. retiflora*, Sweet). A stove perennial, two feet high, produced in 1822: flowers, from May to July, scarlet; propagated by offsets in rich mould.

89. Gaping Amaryllis, (*A. ringens*, Sweet). A stove perennial, one foot high, cultivated in 1821: flowers, in all seasons, reddish white; propagated by offsets in rich mould.

90. Rosy-white Amaryllis (*A. roseo-alba*, Sweet). A stove perennial, two feet high, cultivated in 1821: flowers, in all seasons, reddish white; propagated by offsets in rich mould.

91. Reddish Amaryllis, (*A. rubescens*, Sweet). A stove perennial, eighteen inches high, cultivated in 1821: flowers, in April and May, red; propagated by offsets in rich mould.

92. Reddish Amaryllis (*A. rubicunda*, Sweet). A stove perennial, one foot high, cultivated in 1823: flowers, from May to July, red; propagated by offsets in rich mould.

93. Reddish-saffron Amaryllis (*A. rubro-crocea*, Sweet). A stove perennial, one foot high, cultivated in 1822: flowers, in all seasons, reddish-saffron; propagated by offsets in rich mould.

94. Wrinkled Amaryllis (*A. rugosa*, Sweet). A stove perennial, one foot high, cultivated in 1821: flowers, from April to June, striped; propagated by offsets in common earth.

95. Six-spotted Amaryllis (*A. sexmaculata*, Sweet). A stove perennial, eighteen inches high, produced in 1822: flowers, from June to October, copper-coloured; propagated by offsets in rich mould.

96. Splendid Amaryllis (*A. splendens*, Herbert). A stove perennial, one foot high, cultivated in 1820: flowers, in May and June, scarlet; propagated by offsets in rich mould.—Herb. Arr. Bulb. 52.

97. Sheathy Amaryllis (*A. spathacea*, Sweet). A stove perennial, eighteen inches high, cultivated in 1821: flowers, in all seasons, red; propagated by offsets in rich mould.—Bot. Mag. 2315.

98. Narrow-flowered Amaryllis (*A. stenantha*, Sweet). A stove perennial, one foot high, cultivated in 1821: flowers, at all seasons, red; propagated by offsets in rich mould.

99. Streaked-flowered Amaryllis (*A. striatiflora*, Sweet). A stove perennial, eighteen inches high, cultivated in 1821: flowers, at all seasons, striped; propagated by offsets in rich mould.

100. Furrowed Amaryllis (*A. sulcata*, Sweet). A stove perennial, one foot high, cultivated in 1821: flowers, from April to June, striped; propagated by offsets in rich mould.

101. Superb Amaryllis (*A. superba*, Sweet). A stove perennial, eighteen inches high, cultivated in 1821: flowers, from April to June, striped; propagated by offsets in rich mould.

102. Twisted-flowered Amaryllis (*A. tortuliflora*, Sweet). A greenhouse perennial, two feet high, produced in 1822: flowers from May to July, scarlet, and twisted; propagated by offsets in rich mould.

103. Tortuous Amaryllis (*A. tortuosa*, Sweet). A stove perennial, produced in 1822: flowers, from June to October, green, scarlet; propagated by offsets in rich mould.

104. Three-coloured Amaryllis (*A. tricolor*, Sweet). A greenhouse perennial, two feet high, produced in 1822: flowers, from May to July, coppery, three-coloured; propagated by offsets in rich mould.

105. Wave-flowered Amaryllis (*A. undulæflora*, Sweet). A stove perennial, eighteen inches high, cultivated in 1821: flowers, at all seasons, purple-white; propagated by offsets in rich mould.

106. Vallet's Amaryllis (*A. Valleti*, Sweet). A stove perennial, one foot high, cultivated in 1821: flowers, throughout the year, purple; propagated by offsets in rich mould.

107. Variable Amaryllis, (*A. variabilis*, Sweet). A greenhouse perennial, one foot high, cultivated in 1823: flowers, from April to August, red-white; propagated by offsets in rich mould.

108. Variegated Amaryllis (*A. variegata*, Sweet). A stove perennial, eighteen inches high, cultivated in 1821: flowers, in June and July, striped; propagated by offsets in rich mould.

109. Veiny Amaryllis (*A. venosa*, Sweet). A greenhouse perennial, one foot high, cultivated in 1822: flowers, from June to October, striped; propagated by offsets in rich mould.

110. Various-coloured Amaryllis (*A. versicolor*, Sweet). A stove perennial, one foot high, cultivated in 1821: flowers, at all seasons, variegated: propagated by offsets in rich mould.

111. Band Amaryllis (*A. vittata*, Hortorum). A stove perennial, one foot high, cultivated in 1816: flowers, from April to May, scarlet; propagated by offsets in rich mould.

112. Riband Amaryllis (*A. vittifera*, Sweet). A stove perennial, eighteen inches high, cultivated in 1823; flowers, from May to July, striped; propagated by offsets in rich mould.

113. Well's Amaryllis (*A. Wellsiana*, Sweet). A stove perennial, eighteen inches high, cultivated in 1820: flowers, in July and August, striped; propagated by offsets in rich mould. [A. C.]

AMASONIA, Linnæus (in honour of *T. Amason*, an American traveller). Amason's Flower. *Didynamia Angiospermia*, Linnæus; *Verbenaceæ*, Jussieu. Calyx five-cleft; corolla tubular; limb five-lobed, rather unequal; stigma two-parted; fruit with four stones; stones one-celled, one-seeded.—Spreng. Syst. Veg., Vol. II., p. 765.

1. Tree-like Amason's Flower (*A. arborea*, Humboldt). Found on the banks of the Orinoco: stem tree-like; leaves oblong-lance-shaped, distantly toothed, smooth; flowers longer than the stalked flower-scales (*bracteæ*).

2. Upright Amason's Flower (*A. erecta*, Linnæus). A pretty evergreen stove perennial, eighteen inches high, from Maranhôa in 1823: leaves oblong-lance-shaped, rather toothed, rough; flowers, in August and September, yellow; flower-scales nearly stalkless, as long as the flower; propagated by suckers in sandy loam. *Taligalea campestris*, Aublet, Gui. 2, 252.

3. Entire-leaved Amason's Flower (*A. integerrima*, Sprengel). Found near the river Magdalena: leaves oblong-lance-shaped, entire, smooth; flower-scales small, stalkless.

4. Scarlet Amason's Flower (*A. punicea*, Vahl). A pretty evergreen stove perennial, eighteen inches high, from Trinidad in 1825: leaves egg-lance-shaped, saw-toothed; flowers, in August and September, yellow; flower-scales stalkless, longer than the flower; propagated by suckers in sandy loam.

AMAUROSIS (from the Greek, *'αμαυρος*, "dark," called, also, *Gutta serena*, and vulgarly, *Glass-eyes*). A disorder of the eyes. The disease is of one or both eyes, producing either partial or total blindness. The nature of this disease, which attacks the horse oftener than any other quadruped, consists in a palsied state of the nerve of the eye, or the expansion of this nerve, termed the retina, rendering the eye unconscious of the presence of light, while at the same time it presents no external alteration of structure. In general, both eyes are affected, and vision is completely and for ever lost. The attack, in most cases, is sudden, and immediately follows some injury done to the brain; blood being effused, and by pressing upon a particular part, destroying the function of that portion from which the nerves of the eye spring. Thus a blow on the head, a fall into a ditch, or over a precipice, a false leap, and the like, have produced amaurosis. When the blindness is complete, it is soon discovered by the animal running against something, when not carefully led; and in this case, when the eyes are examined, the central opening in the coloured part of the eye, termed the pupil, is very much dilated. The coloured part of the eye, termed the iris, that which gives the colour to our own eyes, by dilating and contracting the pupil, regulates the admission of light to the bottom of the eye; and it does this according to the feelings of the retina. When the retina perceives little light, as in a dark apartment, the pupil is expanded to admit a larger

quantity; if the glare of light be intense, then the pupil contracts, and, admitting a smaller quantity, saves the retina from irritation. When the retina perceives no light, either from its own insensibility, or the absence of light, the pupil is dilated to the utmost; and if the pupil remain of the same diameter while the intensity of light varies, amaurosis may be supposed to exist. When only one eye is deemed to be affected, it may be compared with the other; or the eye may be darkened, by shutting it, and then opening it suddenly and holding a lighted candle near it, when it will be seen whether or not the pupil dilates.

Regarding the treatment of amaurosis little can be said; we do not know that there is a single case of recovery on record. When it follows an external injury, and blood is supposed to be effused on some part of the brain, an attempt may be made to procure its absorption. Bleeding, purging, low diet, and blisters or setons behind the ears, are the most likely means; but these have all repeatedly failed.

Amaurosis has followed staggers (*apoplexy*), inflamed brain and stomach staggers (*indigestion*). In these cases the cause is the same as pressure on some part of the brain; but perhaps that arises, not so much from effusion of blood, as from distension of the vessels from the inordinate quantity of blood which the brain receives at such times. A tight cribbiting strap, or an improperly short bearing-rein, or an ill-fitting collar, by impeding the return of blood from the head, may also produce amaurosis. A temporary, though complete attack of this disease, is sometimes observed in stomach staggers, but it disappears if the original disease be cured. Frequent attacks of acute indigestion, however, have been supposed capable of producing permanent amaurosis. [C. S.]

AMBELANIA, Aublet. A genus formed from *Willughbeia acida*, Scopoli.

[A. C.]

AMBER TREES (*Anthospermium*, Linnæus). These plants may be easily propagated by cuttings during any of the summer months, in a border of light earth; they will take root in six weeks' time, provided they are watered and shaded as the season may require; or if these cuttings are planted in pots, and plunged into a moderate hot-bed, they will take root sooner, and there will be a greater certainty of their growing. Afterwards, they should be taken up with a ball of earth to their roots, and planted in pots filled with light sandy earth, and may be exposed to the open air until October, at which time they should be removed into the conservatory, where they should be placed as free as possible from being overhung with other plants; and during the winter season they must be refreshed with water, but should not have too much given them each time, and should have as much air admitted as the weather will permit; for if they are kept too close they will be subject to grow mouldy, and will generally decay soon after; so that if the house is damp, it will be difficult to preserve them through the winter. They must frequently be renewed by cuttings, for the old plants seldom continue above three or four years.

[R. M.]

AMBIGUOUS (in Latin, *ambiguus*). A botanical term, meaning attached nearly equally to the stem and leaves, as in *Lotus siliquosus*.

AMBINUX, Commerson. A genus formed of *Aleurites triloba*, Forster. [A. C.]

AMBITUS (from the Latin *ambio*, "I go round"). The outline or figure represented by the margin of a plant, or the members of a plant. [B. E.]

AMBLE, in horsemanship, is a peculiar kind of pace, in which both the horse's legs of the same side move at the same time. In this pace the horse's legs move nearer to the ground than in the walk; and, at the same time, are more extended. But what is most extraordinary in it is, that the two legs of the same side; for instance, the off-hind and fore leg move at the same time; and then the two near legs, in making another step, move at once, the motion being performed in this alternate manner, so that the sides of the animal are alternately without support, or any equilibrium between the one and the other, which must necessarily prove very fatiguing to him, being obliged to support himself in a forced species of swinging, by the rapidity of a motion, in which his feet are scarcely on the ground. For if in the amble he lifted his feet as in trotting, or even in walking, the swing would be such, that he could not avoid falling on his side; and it is only by keeping his feet very near the ground, and by the quick alternate motion, that he supports himself in this pace, in which the hind leg is not only to move at the same time with the fore leg of the same side, but also to gain on it or touch the ground, a foot, or a foot and a half beyond the spot where the latter grounded. The further the hind leg extends beyond the place where the fore leg grounded, the better the horse ambles, and the whole motion is proportionally faster. Thus the whole difference between the amble and the trot consists in this, that the two legs moving together, in the latter, are in a diagonal position; whereas, in the former, the two legs of the same side move together. This pace, which has been shown to be very fatiguing to the horse, is extremely easy to the rider. It has not the shaking roughness of the trot, which is caused by the resistance of the fore leg, at the lifting up of the hind leg; because in the amble the fore leg of the same side is at rest, and resists the impulse during the whole time that the hind leg is in motion.

Those who are skilled in horsemanship, observe that horses which naturally amble, never trot, and that they are considerably weaker than others. Colts often move in this manner, especially when they exert themselves, and are not strong enough to trot or gallop. Most good horses which have been overworked, and on the decline, are also observed voluntarily to amble, when forced to a motion swifter than a walk. The amble may, therefore, be considered as a defective pace, far from common, being natural only to a few horses, which in general are weaker than others. Add to this, that such amblers as seem the strongest, are spoiled sooner than those which trot or gallop.

Training to the Amble.—There are various methods of discipline employed for bringing young horses to amble. Some recommend the toiling of them in their foot paces, by riding them over rough roads or new ploughed fields, which naturally inures them to the stroke required in the amble; but this disorderly toil is very apt to

weaken, and sometimes even to lame young horses. Others attempt it by stopping them in the gallop or trot; so that by losing both, they necessarily stumble on the amble; but this is apt to spoil a good mouth and rein, and exposes the horses to the danger of hoof reaches, or sinew strains, by over-reaching and the like. Some think ambling by weight the best way; and, in order to do this, either overload the horses with excessive heavy shoes, or fold thick pieces of lead about the fetlock pasterns, without considering that the former are apt to make them interfere, or strike short, with their hind feet; and that the latter, besides that mischief, exposes the horses to incurable strains, crushing of the coronet, breeding of ring-bones and the like, which often occasion a swaying of the back, overstraining of the fillets and the like. Farther, some endeavour to make them amble in hand, before they mount their backs, by means of some wall, smooth pale or rail, or by checking them in the mouth with the bridle in hand, and correcting them with a rod on the hinder hoofs, and under the belly, when they tread false; but this is very apt to spoil spirited horses, even before they can understand what you would have them to do.

The best method seems to consist in trying with your hands, by a gentle and deliberate racking and thrusting of the horses forwards, by helping them in the weak parts of their mouths with the snaffle, which must be smooth, big, and full; and correcting them first on one side, then on the other, with the calves of the legs, and sometimes with spurs. If by this means they can be made to fall readily into an amble, though it may be in a shuffling and disorderly manner, much labour will be saved; for the aptness to amble will render the trammels more easy to them, and they will find the proper motion without stumbling or being frightened. [H. F.]

AMBORA, Jussieu; Bory de St. Vincent. Applied by the former to the *Mithridatea quadrifida* of Willdenow, and by the latter to the *Monimia rotundifolia* of Thouars. [A. C.[

AMBOREÆ, Richard. The first group of *Monimieæ*, characterised by the anthers opening by a longitudinal groove and by the seeds being reversed, containing *Ambora*, *Monimia*, *Ruiza*. [A. C.]

AMBRARIA, Cruse. Threes Shrub. *Diœcia Tetrandria*, Linnæus; *Rubiaceæ*, Jussieu. Flowers of the same structure as in *Anthospermum*; fruit four or five-celled.—D. C. Prod. IV. 580.

1. Smooth Threes Shrub (*A. glabra*, Cruse). A Cape of Good Hope shrub, with leaves in threes, and smooth fruit.

2. Hairy Threes Shrub (*A. hirta*, Cruse). A Cape of Good Hope shrub, with leaves in threes, and hairy fruit. [A. C.]

AMBROMA, Lamarck. The genus *Abroma* of Jacquin. [A. C.]

AMBROSIA, Linnæus (in Greek, 'αμβροσια, from α, privative, and βροτος, "mortal;" having been anciently worn in the garlands of those whose actions had made them famous). Garland Flower. *Monœcia Pentandria*, Linnæus; *Compositæ Ambrosiaceæ*, Jussieu. Male flower: common calyx one-leaved; corolla one-petaled, five-cleft, funnel-shaped; base (*receptaculum*) naked. Female flower: calyx one-leaved, entire, five-toothed beneath, one-flowered; no petals; nut one-seeded.—Spreng. Syst. Veg. III. 851.

1. Mugwort-leaved Garland Flower (*A. artemisiæfolia*, Linnæus). An uninteresting annual, five feet high, from North America in 1759: leaves twice wing-cleft, hoary beneath, the segments toothed; upper leaves wing-cleft; flowers, in July and August, green, in terminal, aggregate clusters; propagated by seed in common soil.

2. Two-toothed Garland Flower (*A. bidentata*, Michaux). A native of North America: leaves stalkless, lance-shaped, one or two-toothed at the base; flowers in solitary clusters.

3. Cumana Garland Flower (*A. Cumanensis*, Kunth). An uninteresting annual, three feet high, from Cumana in 1825: leaves three-parted, or twice wing-cleft, downy, hoary beneath, the segments oblong, toothed, acute; flowers, in July and August, green, in simple clusters; propagated by seed in common earth.

4. Taller Garland Flower (*A. elatior*, Linnæus). An uninteresting annual, eight feet high, from North America in 1696: leaves twice wing-cleft, smoothish, the segments lance-shaped, acute; branches and leaf-stalks hairy; flowers, in July and August, green, in terminal, panicled clusters; propagated by seed in common soil.

5. Variable-leaved Garland Flower (*A. heterophylla*, Mühlenberg). An uninteresting annual, four feet high, from North America in 1817: leaves blunt, hoary beneath; stem-leaves wing-cleft, rather toothed, stalked; branch-leaves lance-shaped, stalkless; flowers, in July and August, green, in solitary clusters; propagated by seed in common soil. *A. absinthiifolia*, Desfontaines; *A. peruviana*, Willdenow).

6. Bristly Garland Flower (*A. hispida*, Pursh). A native of Carolina: leaves twice wing-cleft, smooth, the segments cut; flowers rather in panicled clusters; stem bristly.

7. Entire-leaved Garland Flower (*A. integrifolia*, Mühlenberg). An uninteresting annual, three feet high, from North America in 1816: leaves stalkless, egg-oblong, taper-pointed, saw-toothed, bristly; flowers, from July to September, green, in terminal clusters; propagated by seed in common soil.

8. Sea Garland Flower (*A. maritima*, Linnæus). An uninteresting annual, three feet high, from Italy in 1570: leaves twice wing-cleft, blunt, hoary beneath; stem densely clothed with long loose hairs; flowers, in July and August, green, in terminal, solitary clusters; propagated by seed in common soil. *A. elatior*, and *A. artemisiæfolia*, Besser.—Sch. Hand. III. T. 292.

9. Panicled Garland Flower (*A. paniculata*, Michaux). An uninteresting annual, three feet high, from North America in 1811: leaves twice wing-cleft, smooth; upper leaves wing-cleft; stem rather bristly; flowers, from July to September, green, in terminal, solitary clusters; propagated by seed in common soil.—Pluk. Alm. X. 5.

10. Slender-leaved Garland Flower (*A. tenuifolia*, Sprengel). A native of Monte Video: leaves twice wing-cleft, hoary beneath, the segments remote, line-like, acute, rather toothed; stem hispid; flowers in solitary clusters.

11. Three-cleft-leaved Garland Flower (*A. trifida*, Willdenow). An uninteresting annual, six feet high, from North America in 1699: leaves stalked, three-cleft, taper-pointed, saw-toothed, rough; flowers, from July to September, green, in panicled clusters; propagated by seed in common soil.—Mor. Pl. Hist. Un. VI. 1, 4. [A. C.]

AMBROSIACEÆ, Richard, (from *Ambrosia*). Ambrosian plants, characterised by unisexual flowers; the males in terminal spikes, the females placed in the inner base (*axilla*) of the leaves. Each female flower is enclosed in a cup-shaped calyx-fence of one leaf; corolla short or wanting; style short, with two long summits,

plane and glandular. Fruit, a pip (*achenium*) without any down, enveloped in a fence (*involucrum*). Male flowers with a funnel-shaped calyx, with five stamens attached to it, having their anthers free and distinct. [B. E.]

AMBROSINIA, Linnæus. Ambrosian Plant. *Monœcia Androgynia*, Linnæus; *Aroideæ*, Jussieu.—Spreng. Syst. Veg. III. 771.

1. Bass's Ambrosian Plant (*A. Bassii*, Linnæus). A plant of Sicily and Northern Africa, with the sheath at the top thread-shaped, and bent backwards.

2. Fringed Ambrosian Plant (*A. ciliaris*, Roxburgh). A native of Bengal, with the sheath at the tip egg-shaped and fringed. [A. C.]

AMELANCHIER MEDICUS (named after *Amelanchier*, the Savoy name of the *medlar*). Grape Pear. *Icosandria Pentagynia*, Linnæus; *Pomaceæ*, Jussieu. Calyx five-cleft; petals lance-shaped; stamens not quite so long as the calyx; seed-organs ten-celled, or with five capable of being parted into two each; seed-germs (*ovula*) ten, solitary in the partitions of the cells; fruit a pome, three to five-celled; seeds three to five. Small trees; leaves simple, saw-toothed, temporary; flower-scales (*bracteæ*) line-lance-shaped, temporary.—Medic. Gesch. De Cand. Prod. II. 632.

1. Canadian Grape Pear (*A. Botryapium*, De Candolle). A hardy shrub, six to twelve feet high, from Canada and Virginia in 1796: leaves egg-oblong, suddenly tapering to a point; flowers, in April and May, white, in clusters; fruit (*poma*) purple; propagated by layers in common earth.—De Cand. Sp. 2.

2. Cretan Grape Pear (*A. Cretica*, De Candolle). A hardy shrub, a native of the Isle of Crete: leaves rather roundish, with a notch at the end, sharp-pointed, woolly beneath; flowers, white, in clusters; propagated by layers in common earth. *Pyrus Cretica*, Willdenow.—Desf. 79, Tab. 59. De Cand. Sp. 4.

3. Oval-leaved Grape Pear (*A. ovalis*, De Candolle). A hardy shrub, six to eight feet high, from North America in 1800: leaves roundish-oval, pointed; flowers, in April and May, in clusters; clusters pressed together; petals inversely egg-oblong; calyx downy; berries about the size of peas; propagated by layers in common earth. *Crataegus spicata*, Lamarck.—De Cand. Sp. 3.

Var. a. Rather entire-leaved (*A. semi-integrifolia*, Hooker). A hardy shrub of the river Colombia: leaves for the most part saw-toothed towards the tip.—Hook. Fl. Bor. p. 201.

Var. b. Rather heart-shaped (*A. subcordata*, De Candolle). A hardy shrub, six to eight feet high, from the mountains of New York: leaves rather heart-shaped at the base. *Aronia subcordata*, Rafinesque; *Malus macrocarpa*, Rafin. Dec.—De Cand. Sp. 3, Var. β.

4. Blood-fruited Grape Pear (*A.? sanguinea*, De Candolle). A hardy shrub, four to eight feet high, from North America in 1800: leaves oblong, rounded at each end, sharply saw-toothed; flower-scales (*bracteæ*) and leaf-scales (*stipulæ*) feathery; flowers, in April and May, white, in headed clusters; calyx smooth without; fruit blackish-purple; propagated by layers in common earth. *Pyrus sanguinea*, Pursh; *Aronia sanguinea*, Nuttal; *Mespilus Canadensis γ, rotundifolia*, Michaux.—Bot. Reg. 1171. De Cand. Sp. 5.

5. Common Grape Pear (*A. vulgaris*, Mœnch). A hardy shrub, three to six feet high, from the South of Europe in 1596: leaves roundish-oval, bluntish, downy beneath, but finally smooth; flowers, in April and May, white, in clusters; fruit (*poma*) dark purple; propagated by layers in common earth. *Mespilus Amelanchier*, Linnæus.—Bot. Mag. 2430. De Cand. Sp. 1. [A. C.]

AMELETIA, De Candolle (from the Greek, 'αμιλητος, "neglected," the genus being formerly included in *Peplis*). Neglected Flower. *Tetrandria Monogynia*, Linnæus; *Lythrariæ*, Jussieu. Calyx tubular, bell-shaped; larger lobes four, upright, egg-oblong, taper-pointed, converging; smaller lobes four, tooth-formed at the recesses; no petals; stamens four, inserted into the tube of the calyx; seed-organ egg-shaped; style thread-shaped; stigma headed; capsule egg-shaped, when young two-celled, afterwards one-celled, two-valved, many-seeded.—De Cand. Prod. III. 76.

1. Indian Neglected Flower (*A. Indica*, De Candolle). A stove or greenhouse herb, about six inches high, native of the East Indies: branches nearly four-cornered; leaves opposite, entire; flowers in axillary stalkless spikes, rather longer than the leaves; propagated by seed sown thinly in a hot-bed. *Peplis Indica*, Willdenow; *Ammannia peploides*, Sprengel. [A. C.]

AMELIORATING SUBSTANCES. Such substances, whether of the animal or vegetable kind, as, when applied to land, render it more fertile and productive. All the different sorts of dungs and composts are of this kind.

Ameliorating crops are such as are supposed to improve the lands on which they are cultivated. Most of those plants which have a large stem and shady leaf are thought to render the soils in which they are grown more fertile. Carrots, turnips, artificial grasses, such as contain a large proportion of nutritious materials, and many other green vegetable products, are in general considered as ameliorating; but all kinds of crops carried off the land, in some degree or other exhaust the ground; and green crops, such as have just been mentioned, do this, only less so than such crops of grain or other vegetables as contain large proportions of gluten or vegeto-animal matter in their compositions. The improvement of lands, therefore, by what are commonly termed ameliorating crops, probably depends, in a great measure, upon the culture which the ground receives while they are growing, and the returns which they make to it in the way of manure, after being consumed by animals.

More, however, probably depends on the nature of the excrementitious matter thrown into the soil by the crop, than has hitherto been investigated. For example, if a previous crop of beans throws into the soil its peculiar excrementitious slime, this, instead of injuring, may be advantageous to a crop of wheat or oats. Something also ought to be allowed for the opening of the soil, as is effected by large roots, such as potatoes. [B. E.]

AMELLUS, Linnæus (the name of a plant mentioned by Virgil). Virgil's Flower. *Syngenesia Superflua*, Linnæus; *Compositæ Carduaceæ*, Jussieu. Base (*receptaculum*) abounding with chaffy scales; fruit-crowns (*pappus*) simple; fence tiled; florets of the ray undivided.—Spreng. Syst. Veg. III. 575.

1. African Virgil's Flower (*A. lychnitis*, Linnæus). A pretty evergreen, greenhouse trailing plant, six inches high, from the Cape of Good Hope in 1768: leaves line-like, lance-shaped, opposite, hoary; branch leaves alternate; flowers, in June and July, violet, stalked in terminal bunches; propagated by cuttings in peaty loam.—Jacq. Icon. 10, 1.

2. Rather thorny Virgil's Flower (*A. spinulosus*, Pursh). A pretty evergreen perennial, two feet high, from about the river Missouri in 1811: plant hoary; leaves wing-cleft, cut, toothed, the divisions rigid, line-like; flowers, in August and September, yellow, in lateral and terminal clustered heads; propagated by division of the plant in common soil. *Sideranthus spinulosus*, Sweet; *Starkia spinulosa*, Nuttal.

3. Slender-leaved Virgil's Flower (*A. tenuifolius*, Lamarck). A shrubby plant, supposed to be a native of the Cape of Good Hope: leaves alternate, line-like, entire, rather hairy; branches one-flowered. *A. alternifolius*, Roth; *A. annuus*, Willdenow.

4. Velvety Virgil's Flower (*A. villosus*, Pursh). A pretty evergreen perennial, one foot high, from about the river Missouri in 1811: very velvety; leaves, without foot-stalks, oblong, taper-pointed, entire; flowers, in August and September, yellow, in axillary heads, on short stalks; propagated by division in common soil. *Sideranthus villosus*, Sweet. [A. C.]

AMENTACEÆ (from the Latin, *Amentum*, "a catkin"). A group of plants, chiefly trees, with flowers in catkins, such as willow and poplar; but these have been, by most continental botanists, arranged in other groups, such as the *Ulmaceæ*, *Salicineæ*, *Myriceæ*, *Betulineæ*, *Cupuliferæ*, and *Plataneæ*. [B. E.]

AMENTUM (said to be derived from the Greek, '*αμμα*, "a thong," "loop," or "band"). Catkin: a species of *inflorescence*, which consists of a common rounded receptacle, beset with numerous scales, each of which is accompanied by one or more stamens or pistils, so that the whole forms an aggregate flower. The willow, and many other plants have this form of flowering. [A. C.]

AMERICAN ALOE. The *Agave Americana* of Linnæus. See MAGUEY. [A. C.]

AMERICAN ALLSPICE. *Calycanthus floridus*, Linnæus; or, Carolina Allspice.

AMERICAN BLIGHT. A popular but very inappropriate name for an insect (*Eriosoma Mali*, Leach; *Aphis lanigera*, Illiger), very injurious to apple trees, supposed, though on no very clear evidence, to have been introduced from America. Mr. Knapp says he was informed that it was first observed in the West of England in 1819, in the nursery gardens of Messrs. Millar and Sweet, near Bristol, introduced, as was supposed, by some imported plant. Mr. Salisbury again says, "I have, from good authority, heard that it was brought to this country from France, in the reign of Louis XIV., when a colony of refugees settled at Paddington; and there it was first observed to begin its depredations on the apple trees. I am in some measure warranted in my belief, that the insect in question was introduced from France, as an old French gardener, who worked in my garden, stated that he was well acquainted with the bug, as he termed it, since his childhood; and that it had been the destruction of many fruits, not apple trees in particular, in the neighbourhood of Montpelier, where he had been brought up (*Hints on Orchards*, p. 39)." M. Blote again informs us that it is exceedingly destructive to the apple trees in the department of Calvados (*Mem. Société Linn. de Caen, pour* 1284, p. 104). We seem to be indebted for the supposition of its American origin, to Sir Joseph Banks, who traced the supposed first appearance of the insect to a nursery in Sloane Street, Chelsea; and upon being informed that it was unknown in France, concluded that it was most probably imported from North America, with some apple trees which had been brought over to this nursery. But, in whatever way it originated, it spread rapidly, though it was at first confined to the vicinity of the metropolis, where it destroyed thousands of trees. Subsequently it found its way into other parts of the kingdom; and, in 1810, so many of the cider apple trees in Gloucestershire were infested with it, that it was apprehended the making of cider would have been abandoned for the season.

A periodical writer, who signs Rusticus, has described this insect on the wing, as having "the appearance of a bit of cotton or a downy seed, floating in the air, and as readily driven about by every breath of wind,"—a description which applies as well to the poplar plant louse (*Aphis Populi*, Linnæus; *Eriosoma Populi*, Leach), a very different insect, harmless to fruit trees. A detailed account of the insect is given in the *Journal of a Naturalist*, which, with the correction of a few errors and oversights of the author, we shall now follow.

Early in summer, and even in spring, about March, a slight hoariness is observed upon the branches of certain species of our orchard fruit. As the season advances this hoariness increases, and becomes cottony; and toward the middle or the end of summer, the upper sides of some of the branches are invested with a thick, downy substance, so long as at times to be sensibly agitated by the air. Upon examining this substance, we find that it conceals a multitude of small, wingless creatures, which are busily employed in preying upon the limb of the tree beneath. This they are well enabled to do, by means of a beak terminating in a fine bristle; this being insinuated through the bark, and the sappy part of the wood, enables the creature to extract, as with a syringe, the sweet, vital liquor that circulates in the plant. This terminating bristle is not observable in every individual, from being usually, when not in use, so closely concealed under the breast of the animal, as to be invisible. In the younger insects it is often manifested by protruding, like a fine termination, to the vent (*anus*); but as their bodies become lengthened, the bristle is not in this way observable. The pulp wood (*alburnum*) being thus wounded, rises up in excrescences and nodes all over the branch, and deforms it: the limb, deprived of its nutriment, grows sickly; the leaves turn yellow, and the part perishes. Branch after branch is thus assailed, until they become leafless, and the tree dies.

Plant Lice (*Aphides*), in general, attack the younger and softer parts of plants; but this insect seems easily to wound the harder bark of the apple, and does not always make choice of the most tender branch. They give a preference to certain sorts, but not always the most rich fruits; as cider apples, and wildings, are greatly infested by them; and from some unknown cause, other varieties seem to be exempted from their depredations. The Wheeler's russet, and Crofton pippin, have never been observed to be injured by them; and the insect is so fastidious in its selections, that it will frequently attack the stock or the graft, leaving the one or the other

untouched, should it consist of a kind not to its liking. This insect is viviparous, or produces its young alive, forming a cradle for them by discharging from the extremities of its body a quantity of long, cottony matter; which, becoming interwoven and entangled, prevents the young from falling to the earth, and completely envelopes the parent and offspring. In this cottony substance, we observe, as soon as the creature becomes animated in the spring, and as long as it remains in vigour, many round pellucid bodies, which, at the first sight, look like eggs, only that they are larger than we might suppose to be ejected by the animal. They consist of a sweet glutinous fluid, and are not the eggs but the discharges of the insects. In the autumn, the winds and rains of the season partly disperse these insects; and we observe them endeavouring to secrete themselves in the crannies of any neighbouring substance. Should the savoy cabbage be near the trees whence they have been dislodged, the cavities of the under sides of its leaves are commonly favourite asylums for them. Multitudes perish by these rough removals, but numbers yet remain; and we may find them in the nodes and crevices, on the under sides of the branches, at any period of the year, the long, cottony vesture being nearly all removed; but still they are enveloped in a fine short downy clothing, to be seen by a magnifier, proceeding apparently from every suture or pore of their bodies, and protecting them in their dormant state from the moisture and frosts of our climate. This insect, in a natural state, usually awakens and commences its labours very early in the month of March; and the hoariness on its body may be observed increasing daily; but if an affected branch be cut in the winter, and kept in water in a warm room, these creatures will awaken speedily, spin their cottony nests, and feed and discharge as accustomed to do in a genial season.

Salisbury says, these insects winter beneath the surface of the soil in crevices of the root-bark; but though this may certainly occur we have found them more commonly in cracks, and under the angles of branches at a considerable distance from the ground; and in all cases much diminished from their summer numbers by the cold, as well as by the depredations of their enemies. We have observed the insect to be very fastidious as to its feeding places. A tree, for example, which has been much infested one season, not having one, or only a very few of the insects on the succeeding season; while a tree a few yards distant, previously free, shall become all over a prey to the pest. An espalier stock, also, may have one-half of its branches covered with the insects, while another half is entirely free from them.

It does not appear to us, that the feeding organs (*trophi*) of this insect are capable of easily penetrating old bark; for, though numerous colonies of them be found on the oldest trunks, these appear to begin in some recent crack or wound in the bark; and hence, from the extravasation and oozing out of the organic juices, new bark is formed, and this affords a substance easily penetrable; while, as the colony increases, new perforations are made, irregular excrescences are produced, deforming the tree, and draining off the nutriment which would otherwise have gone to the production of flowers and fruit. The young branches, however, are always the most infested during the summer; and the crevices in the old bark are only resorted to when cold weather renders shelter necessary.

Remedies.—A considerable number of methods have been proposed in books for getting rid of the insect in question. White-washing or washing with lime-water has been tried, but is not so efficacious as the application of any glutinous substance, which may cover the insects and dry over them. Double size or glue, liquefied by heat, and applied by means of a brush, particularly in March, when the insects begin to show more cottony than in winter, is a very effectual remedy, if no crevice of a tree is left unsized. This, however, may be dissolved by the rain, and therefore a varnish is recommended by Mr. Knapp as follows: "Melt about three ounces of resin in an earthen pipkin, take it from the fire, and pour it into three ounces of fish oil; the ingredients perfectly unite, and when cold acquire the consistence of honey. A slight degree of heat will liquefy it, and in this state paint over every node or infected part in your tree, using a common painter's brush. This I prefer doing in spring, or as soon as the hoariness appears. The substance soon sufficiently hardens, and forms a varnish, which prevents any escape, and stifles the individuals. After this first dressing, should any cottony matter appear round the margin of the varnish, a second application to these parts will, I think, be found to effect a perfect cure. The prevalence of this insect," adds this author, "gives some of our orchards here the appearance of numerous white posts in an extensive drying ground, being washed with lime from root to branch; a practice, I apprehend, attended with little benefit. A few of the creatures may be destroyed by accident; but as the animal does not retire to the earth, but winters in the clefts of the boughs, far beyond the influence of this wash, it remains uninjured, to commence its ravages again when spring returns."

All oily or resinous substances, however, being prejudicial to trees, Mr. George Lindley recommends vinegar as a wash for young trees; and, as less expensive for old trees, a sort of paint, composed of one gallon of quicklime, half a pound of flowers of sulphur, and a quarter of a pound of lamp black, mixed with boiling water to the consistence of whitening for white-washing, and laying it on rather more than blood warm with a brush. This should be done in March, and again in August, when the winged insects spread from tree to tree.

Mr. Couch, as a cheap and certain remedy, recommends three quarters of an ounce of sulphuric acid, by measure, to be mixed with seven ounces and a half of water. It should be applied all over the bark by means of rags, the only parts excepted being the present year's shoots, which it would destroy. This destroys moss and lichens, as well as insects; and if applied in showery weather, will be washed into every crevice in which they can harbour. (See APHIDÆ). [B. E.]

AMERICAN COWSLIP (*Dodecatheon Meadia*, Linnæus). This plant is propagated by offsets, which the roots put out pretty freely when they are in a loose moist soil, and a shady situation; the best time to remove the roots, and take away the offsets, is in August, after the leaves and stalks have decayed, that they may be fixed well in their new situation before the frost comes on. It may also be propagated by seeds, which the plants

Notice.—The Publishers have to state that the figures, *Amaryllis Calyphata* and *Amaryllis Hyacinthia*, given in the Plate to Part I. of this Work, were copied from Edwards's Botanical Register, for the months of December, 1816, and January, 1817, (forming part of the second volume of the first series); this much they owe to the Proprietors of that Work, but they also owe it to themselves to add, that in this encroachment they are wholly blameless, having employed (as they conceived) a competent artist, with instructions to make Original Drawings of the Plants in question, and having paid a price for the Drawings which ought to have protected them from such complaints.

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